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# OLD AGE AND BASAL METABOLISM*

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WITH the view of extending its observations on the physiology, particularly the metabolism, of human beings from birth to old age, the Nutrition Laboratory has in the past five years made a special effort to secure measurements on people over sixty years of age. This has already resulted in the publication of metabolism measurements on a group of elderly women[6] and in the report of a comprehensive physiological study of an extraordinarily vigorous 91-year old man[7]. Meanwhile further observations on elderly people, both men and women, have been made by a field worker. It is the purpose of this present report to record these observations and assess them, along with the old age data already published by the Nutrition Laboratory. The difficulties of studying the metabolism of normal people of advanced age can hardly be overestimated. Complete coöperation from the subjects is necessary and a hospital environment is prohibited, both features that contribute to increase the difficulties of securing suitable subjects. The opportunities for studying the metabolism of youth or middle age are frequent, especially in the physiological laboratories of colleges, where large numbers of normal individuals are available. Observations on human beings beyond middle age are, however, usually confined to those who are hospitalized or to those who have reached the convalescent stage in a hospital. It is our firm belief that measurements on so-called "hospital normals", although having perhaps for diagnostic purposes a certain value, are not to be considered as representing the true picture of the normal physiology of people of these various ages. Consequently in our present study we sent a field worker directly into the homes of a number of elderly people (some of them her personal acquaintances) in the vicinity of Bangor, Maine, to measure their metabolism in their own home environment. Since it is infinitely more difficult to study individuals over seventy years of age than those below this age, we concentrated upon the higher ages.

The technician (Miss Adelaide Swasey) had been associated with the Nutrition Laboratory for a number of years and had been thoroughly trained here in basal metabolism technique. The measurements were made with the field respiration apparatus[3], to which the subjects adjusted themselves readily. This apparatus employs a mouthpiece and noseclip and, from the psychological as well as the physiological standpoint, does not permit such normal measurements as the more modern helmet apparatus[4] used in the two preceding old age studies[6, 7]. Nevertheless for this field study we felt it more important to take the apparatus to the bedside of each subject and measure the metabolism in the environment to which the subject was accustomed, rather than to bring the subjects to a hospital where they could be studied with the helmet apparatus. In a hospital or institution the helmet apparatus has a definite advantage and cannot be recommended too strongly, but for field work the field respiration apparatus has proved most satisfactory. It is being employed continually in our racial studies and has proved sufficiently transportable and simple in manipulation to be used actually in the Australian bush[12].

The subjects (five men and ten women) had not undergone a complete physical examination prior to the tests, which is an admitted defect. Physicians had been consulted occasionally by some of the subjects, but it was impracticable, except in a few instances, to secure statements from medical men as to the physical assessment of all these subjects at the time of measurement*. Rough estimates of the degree of vigor of these subjects, made by our field worker and based upon general impressions received at the times of her contacts with them, are indicated in tables 1 and 3. The letter A indicates those most vigorous from the physical standpoint, and the letters B and C indicate those with correspondingly less physical vigor. None of the subjects were bedridden. All were active and able to be about, and came under the general classification of people "presumably in good health".

The observations were made in the morning, with the subjects in the postabsorptive condition, after a good night's sleep in their own beds. The bladder was emptied about 6:30 A.M.

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*We wish to express our appreciation to Dr. C. S. Philbrick, Dr. W. S. Purinton, and Dr. I. F. Gregory of Bangor, Maine, who were especially coöperative in giving us information regarding their examinations on some of these subjects. (See page 1121.

Shortly after 7 A.M. the operator entered the bedroom, set up the apparatus, which is extremely simple, and measured the oxygen consumption for several periods. The length of each day's test was thus from thirty to about forty-five minutes. These measurements were repeated at intervals of a few days until the oxygen consumption had been determined on three different days, occasionally four days, within a period of three weeks. Observations were likewise taken of the pulse rate, the respiration rate, and the mouth temperature. The data were all secured between February 12 and June 28, 1934. In accordance with the difference in the time of year the temperature of the bedroom varied from an average of about 15° to a maximum of 22.5° C. on one day. But since the subjects were measured while well protected with bedclothing, under the same conditions under which they had slept comfortably all night, the environmental temperature played no rôle in these measurements.

## DISCUSSION OF RESULTS

The oxygen values have been reduced to 0° C. (dry) and 760 mm. The results from day to day with any given subject agreed remarkably well. Since each subject was in his or her personal, familiar environment, the measurement on the first day was almost invariably duplicated by the results on the second and third days. This was shown not only in the oxygen consumption but in the pulse rate and the respiration rate. If there had been undue excitement or agitation because of the novelty of the experience, one would have expected a higher metabolism on the first day of measurement. This confirms findings noted in other surveys, namely, that if the measurement is made carefully and quietly with an apparatus that is not too formidable, too disturbing, or too uncomfortable to the individual, the degree of apprehension may be reduced to such a point that the metabolism will not be significantly higher on the first day of a series of observations than on subsequent days.

Although the observations extended over a period of 4½ months (February to June), the metabolism measurements did not tend to be higher in one month than in another and there is nothing in the data to indicate that difference in season over this rather short period had any effect upon the metabolism.

## OBSERVATIONS ON ELDERLY MEN

Although this study deals in large part with the metabolism of elderly women, supplementing the earlier studies on aged women made by the Nutrition Laboratory[6, 11], opportunity was taken to measure five elderly men. The pertinent data secured with these men are given in table 1, the values for the several days of measurement being averaged for each subject. With regard to the intellectual and physical status of these men we have only general impressions. They were presumably in good health, but certainly none of them is to be compared in vigor, either intellectually or physically, with the three previously studied nonagenarians in whom the Nutrition Laboratory has been interested, namely, Sir James Crichton-Browne (studied by Dr. C. G. L. Wolf of Cambridge, England), Dr. W. W. Keen of Philadelphia (studied by Dr. W. H. Stoner), and Mr. S. W. Lincoln*. The ages, weights, and heights of these three extraordinarily active and dynamic men at the time of measurement were as follows:

| | | | |
|---|---|---|---|
| J. C.-B. | 89 yrs. | 58.8 kg. | 172 cm. |
| W. W. K. | 89 yrs. | 60.3 kg. | 154 cm. |
| S. W. L. | 91 yrs. | 58.2 kg. | 172 cm. |

The great variability in the various methods of prediction available for elderly men is shown by the data in table 2, in which are reported the deviations of the actually measured heat production from the metabolism predicted by the standard methods of Harris and Benedict[11], Aub and Du Bois[1], and Dreyer[9]. In the upper part of the table are given the percentage de-

*An extensive report of the elaborate physiological examination of S. W. L. has already been given in this journal[7]. In this report we failed to cite the interesting observations on elderly men by Mosler and Edelstein[10]. The citation is given here to make our survey of the literature on the metabolism in old age complete. Comparison of their results with our data, however, cannot be made satisfactorily, inasmuch as their subjects were "hospital normals" and their basal metabolism data are presented only on the basis of percentage deviations from prediction standards and not on the basis of oxygen consumption or heat production.

TABLE 1

BASAL METABOLISM OF ELDERLY MEN—BANGOR SERIES

| Subject | Age | Weight (Without Clothes) | Height | Pelidisi | Vigor | Pulse Rate | Respiration Rate | $O_2$ per Min. | Heat Production per 24 Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Total | Per Kg. | Per Sq. M. |
| | yrs. | kg. | cm. | | | | | cc. | cal. | cal. | cal. |
| M | 87 | 52.2 | 169 | 89 | A | 44 | 11 | 131 | 910 | 17.4 | 572 |
| N | 87 | 62.6 | 167 | 96 | C | 50 | 14 | 196 | 1362 | 21.8 | 796 |
| O | 82 | 78.6 | 176 | 99 | D | 36 | 12 | 243 | 1688 | 21.5 | 866 |
| P | 74 | 65.3 | 168 | 98 | C | 54 | 13 | 183 | 1271 | 19.5 | 730 |
| Q | 74 | 73.9 | 175 | 97 | A | 48 | 17 | 211 | 1466 | 19.8 | 776 |

viations for the three previously studied elderly men and in the lower part the deviations for the Bangor men. According to the Harris-Benedict predictions the greatest plus deviation is with one of the three men in unusually good physical condition, W. W. K., and the greatest minus deviation is with one of the Bangor men, subject M. According to the Aub and Du Bois predictions and likewise according to the Dreyer predictions the greatest plus deviation is with subject O and the greatest minus deviation with subject M. Analysis of the measurements made on the first three men listed in table 2 has already shown that the great differences in their metabolism cannot easily be explained. Consequently it is futile to expect with additional data on only five other elderly men to make any adequate analysis of the basal metabolism of elderly men. Hence the data in table 1 are presented chiefly to put on record the results of the carefully measured metabolism of these five Bangor men and, pending accumulation of further data on elderly men*, no detailed analysis of the data can be made.

TABLE 2

COMPARISON OF STANDARD METHODS OF PREDICTING THE BASAL METABOLISM AS APPLIED TO ELDERLY MEN

| Subject | Deviation of Measured Metabolism from Standard of | | |
|---|---|---|---|
| | Harris and Benedict | Aub and Du Bois | Dreyer |
| | p. ct. | p. ct. | p. ct. |
| J. C.-B. | +17.6 | — 5.2 | + 1.6 |
| W. W. K. | +26.2 | + 2.9 | + 1.1 |
| S. W. L. | — 4.5 | —24.0 | —18.4 |
| M | —12.7 | —30.9 | —26.7 |
| N | +15.9 | — 3.9 | + 0.2 |
| O | +14.5 | + 4.6 | +10.0 |
| P | — 2.6 | —14.3 | —10.4 |
| Q | + 0.5 | — 8.9 | — 2.8 |

OBSERVATIONS ON ELDERLY WOMEN

The results of the observations on the ten elderly women in the Bangor series are given in table 3. The body weights of these women differ greatly, from 37.9 to 81.0 kg. The heights are well within normal limits for women from sixty-nine to eighty-eight years of age. In general configuration these elderly women present no particular abnormalities. Absence of erect posture is to be expected in extreme old age, but for the most part these women were erect in carriage and only a few (subjects A, B, and H—and the man N) were obviously bent. The heights, as measured, of these few with bent posture might be expected to be too low and hence their pelidisi (calculated from the body weight and the sitting height), which according to Pirquet[20] is the best index of state of nutrition, would be somewhat too large. However, the pelidisi even in these instances may be taken as real indices of the comparative states of nutrition. With only two women (B and D) do the pelidisi suggest a slight degree of undernutrition. With subject C, on the contrary, the pelidisi suggests obesity.

The mouth temperatures of these subjects, both men and women, were well within normal limits. There is nothing in the data for pulse rate or respiration rate to challenge attention. The respiration rates are perhaps slightly lower than would be expected with a group of younger people. There are not sufficient data for either elderly women or men to justify a comparison of the two sexes. Indeed the variability in the basal metabolism of the few old men thus far studied is so great that such a comparison can be made only when larger numbers of elderly people of both sexes have been studied.

*Total heat production referred to age and weight.* In our analysis of the factors affecting the metabolism in old age we shall consider only the results obtained with women. Since the data for the ten women listed in table 3 are too few to justify group analysis, we shall in-

TABLE 3

BASAL METABOLISM OF ELDERLY WOMEN—BANGOR SERIES

| Subject | Age | Weight (Without Clothes) | Height | Pelidisi | Vigor | Pulse Rate | Respiration Rate | $O_2$ per Min. | Heat Production per 24 Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Total | Per Kg. | Per Sq. M. |
| | yrs. | kg. | cm. | | | | | cc. | cal. | cal. | cal. |
| A | 88 | 52.8 | 153 | 99 | D | 57 | 13 | 135 | 938 | 17.8 | 630 |
| B | 86 | 43.8 | 164 | 87 | B | 55 | 16 | 141 | 980 | 22.4 | 676 |
| C | 80 | 62.4 | 144 | 111 | A | 55 | 12 | 176 | 1223 | 19.6 | 805 |
| D | 79 | 37.9 | 153 | 88 | B— | 71 | 14 | 135 | 938 | 24.7 | 727 |
| E | 75 | 68.0 | 159 | 104 | B+ | 56 | 15 | 182 | 1265 | 18.6 | 744 |
| F | 75 | 55.1 | 164 | 94 | B | 56 | 15 | 186 | 1292 | 23.4 | 813 |
| G | 73 | 62.3 | 162 | 99 | B | 63 | 11 | 155 | 1077 | 17.3 | 649 |
| H | 72 | 44.0 | 160 | 90 | C | 55 | 13 | 139 | 966 | 22.0 | 680 |
| J | 72 | 81.0 | 167 | 105 | C | 64 | 10 | 223 | 1549 | 19.1 | 815 |
| K | 69 | 49.7 | 156 | 95 | B— | 67 | 11 | 150 | 1042 | 21.0 | 709 |

*No furtner study of elderly men by the Nutrition Laboratory is planned.

clude in our considerations the results of observations on elderly women previously reported from the Nutrition Laboratory[6, 11]. In figure 1 is plotted the total heat production per twenty-four hours referred to age for these women sixty-six years of age and over, the solid circles representing the data for women previously reported by Benedict and Meyer[6], the hollow circles the data for three women within this age range from the Harris-Benedict group[11], and the crosses our present Bangor series. Since all three series of measurements were made by technicians thoroughly trained at the Nutrition Laboratory, the data are strictly comparable, and for any analysis of the major problems the three series may properly be treated as a whole rather than confining the discussion to the Bangor data. Earlier biometric analysis[11] of data

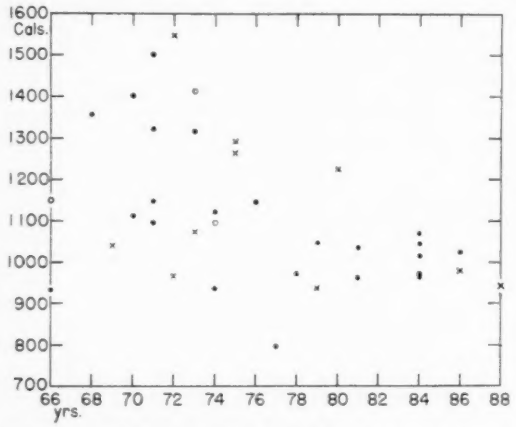


FIGURE 1. *Total twenty-four hour basal heat production of elderly Caucasian women referred to age.*

The solid dots represent the measurements reported by Benedict and Meyer, the hollow circles those by Harris and Benedict, and the crosses the Bangor data.

secured with younger human beings has brought out the fact that there is a regular decline in basal metabolism with advancing age. Although the scatter of the points in figure 1 is admittedly wide, it is apparent from these data also that at the more advanced ages the total heat production is for the most part lower than at the earlier ages. That this difference may not be uncritically assigned to the age factor alone, however, is brought out by comparison of the body weights, especially for those individuals showing the extremes in heat production. Thus the minimum total twenty-four hour heat production of 799 calories is that of a seventy-seven year old woman weighing but 31.8 kg., whereas the maximum heat production of 1549 calories is that of a seventy-two year old woman weighing 81 kg. Great differences in body weight therefore have a pronounced influence upon the metabolism even at these advanced ages. Innumerable comparisons of basal metabolism data on human beings have been made at the Nutrition Laboratory that take into consideration the height, weight, and pelidisi in an attempt to refer the metabolism measurements to the state of nutrition, that is, to the degree of overweight or underweight. But for the most part they have been unsuccessful. It is apparent, however, that the plotted points in figure 1 deviating most widely from the general trend represent individuals whose body weights differ most widely from the average.

Figure 1 is introduced, however, primarily to accentuate a point brought out in discussion of the earlier series of data on elderly women[6], namely, that *the total twenty-four hour heat production of women seventy-eight years of age and over appears to be close to 1000 calories, irrespective of weight or age.* In the Bangor series (represented in figure 1 by crosses) three of the four women over seventy-eight years old (weighing 38, 44, and 53 kg., respectively) likewise have a total heat production approximating this level. With one of the Bangor subjects (C), eighty years old and weighing 62 kg., the total metabolism was 1223 calories. This value is not to be questioned, since it represents an average of four different experimental days of measurement, with close agreement on all four days. Of the elderly women studied by Matson and Hitchcock[17] two at the age of eighty years (72 and 82 kg., i.e., overweight) had a total heat production higher than 1000 calories but two others, aged eighty-three and ninety-one years (57 and 52 kg.), come in line with our general series. From an analysis of all the data available we can reiterate our earlier suggestion, namely, that the clinician may state with a high degree of probability that the normal woman over seventy-eight years of age, will, irrespective of body weight unless grossly overweight or underweight, have a total basal heat production per twenty-four hours of not far from 1000 calories. This value represents the heat production of the individual as a whole and must not be confused with the classic figure of 1000 calories accepted generally as representing the heat production of any and every warm-blooded animal *per square meter of body surface* per twenty-four hours. Recent evidence accumulated at the Nutrition Laboratory strongly opposes the conception of approximate constancy in this latter value, but this evidence has no bearing upon this particular study.

*Heat production per kilogram of body weight referred to age.* One of the commonest methods of comparing the metabolism of individuals of different sizes has been to refer the metabolism to the body weight, on the assumption that the larger the animal the larger the heat production. Comparison of the metabolism of our three groups of elderly women on the basis of the heat production per kilogram of body weight referred to age shows an even greater dispersion

of points than is the case when the total metabolism itself is considered. In other words, there is apparently no correlation between the heat production per kilogram of body weight and the age. Whether this is because the differences in the weights of women of advanced age represent chiefly differences in amounts of adipose tissue, which is inert metabolically, can be determined only after further experiments have been made.

*Heat production per square meter of body surface referred to age.* Another method commonly used in comparing the metabolism of individuals of different sizes is to express the heat production per square meter of body surface. The metabolism thus calculated has been referred to age in figure 2. The surface areas of these women were not actually measured but were computed from the measured heights and weights by use of the Du Bois height-weight chart for body surface[10]. If, as has already been suggested, the measurements of the heights of some of these elderly women are too short, then the calculated surface areas in these instances are too small and hence the values for heat production per unit of surface area are too large. Consequently if a correction should be made in figure 2 for the probable error in the surface area, the result would be to lower somewhat all the plotted points. To what extent they would be lowered no one can predict, but at least they would be lowered somewhat rather than raised. The heat production per unit of surface area as shown in figure 2 varies from a minimum of 619 calories with an eighty-four year old woman to a maximum of 858 calories with a seventy-one year old woman. In an earlier discussion[6] it was pointed out that the

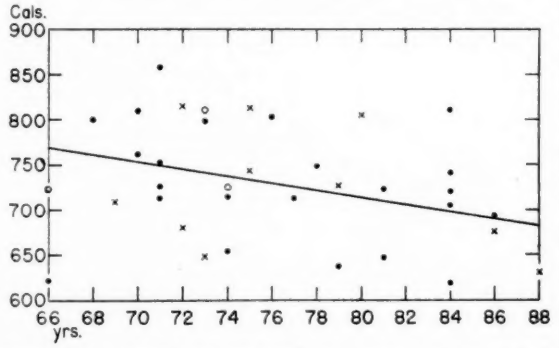


FIGURE 2. *Basal heat production per square meter of body surface per twenty-four hours referred to age—Caucasian women.*

The solid dots represent the measurements reported by Benedict and Meyer, the hollow circles those by Harris and Benedict, and the crosses the Bangor data.

low heat production found with a number of these women does not necessarily indicate that the subjects were abnormal. Thus with the five women in the earlier group having a low heat production per unit of surface area (650 calories or less) the estimated vigor was A+, A, A, C, and E, that is, only one woman was what might be termed feeble. The data in figure 2 show a considerable scatter, notably at eighty-four years, but there is an unmistakable trend downward indicating that not only the total metabolism but likewise the metabolism per unit of surface area tends to decrease as age increases. Although the wide scatter of points makes any attempt to draw a curve on this chart debatable, nevertheless such a curve has been drawn to indicate the general trend, and subsequent use (see page 1119, second paragraph, second column) will be made of this curve in a consideration of possible methods of predicting the basal metabolism of elderly women.

*Heat production per kilogram of body weight referred to weight.* The study of the effect of age on metabolism, with special reference to youth, middle, and old age, can be approached from an entirely different angle. The heat production per kilogram of body weight referred to body weight has been found with animals of various sizes to be larger, the smaller the animal. With normal human beings it has likewise been shown that the smaller the individual,

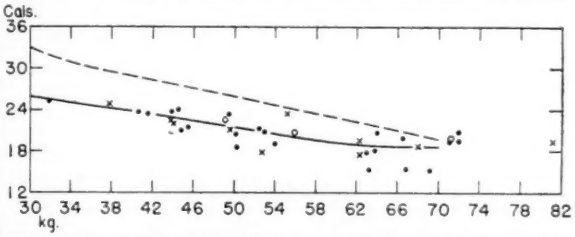


FIGURE 3. *Basal heat production per kilogram of body weight per twenty-four hours referred to weight—Caucasian women.*

The solid dots represent the measurements on elderly women reported by Benedict and Meyer, the hollow circles those reported by Harris and Benedict, and the crosses the Bangor data. The full-line curve indicates the general trend of the metabolism of these elderly women (sixty-six to eighty-eight years old), the broken-line curve the trend of the metabolism of younger women studied by the Nutrition Laboratory.

other things being equal, the higher the heat production per kilogram of body weight. With our elderly women the data for basal twenty-four hour heat production per kilogram of body weight have been plotted with reference to body weight in figure 3, the solid dots, hollow circles, and crosses indicating the same groups as in figures 1 and 2. A smoothed curve (unbroken line) has been drawn through these plotted points to indicate approximately the general trend. The scatter of the plotted data is again very wide, but the general trend indicated by the curve is a downward slope with increasing weights up to 64 kg. From 64 kg. and beyond the curve indicates a constant level of 18.5 calories per kilogram. The age factor as such does not appear in this method of plotting, except that all the plotted points represent women sixty-six years of age and over (average age, seventy-six years). The age factor, however,

may be studied by comparison of the slope and position of the curve drawn through the data for elderly women with the slope and position of the curve (indicated by the broken line in figure 3) derived from data secured by the Nutrition Laboratory on younger women[5, 11] having the same range in weight but varying in age from twelve to sixty years and for the most part between twenty and thirty years. This broken-line curve for women of younger ages lies its entire length above the curve for elderly women. Neither curve has been extended beyond 70 kg., as there are not sufficient data beyond this weight. It is probable, however, that at 74 kg. and beyond the heat production per unit of weight is the same, irrespective of whether the woman is young or old. Obviously a woman of 78 kg. or more is overweight, and the predominant factor in the excess weight is fat. Since fat is inert metabolically, this excess weight automatically lowers the heat production per kilogram of body weight, irrespective of age.

TABLE 4

COMPARISON OF DIFFERENT METHODS OF PREDICTING THE BASAL METABOLISM OF ELDERLY WOMEN

| Subject | Age | Weight | Height | Total 24-Hour Heat Production (As Measured) | Deviation of Measured from Predicted Heat Production: 1030 Cals. | Cals. per Sq. M. Referred to Age | Cals. per Kg. Referred to Weight | Harris-Benedict | Aub Du Bois | Dreyer |
|---|---|---|---|---|---|---|---|---|---|---|
| | yrs. | kg. | cm. | cal. | p. ct. | p. ct. | p. ct. | p. ct. | p. ct. | p. ct. |
| A | 88 | 52.8 | 153 | 938 | —10.8 | — 7.8 | —14.4 | — 9.1 | —18.0 | —16.5 |
| B | 86 | 43.8 | 164 | 980 | ± 0.0 | — 2.0 | — 1.8 | + 0.5 | —12.0 | — 4.5 |
| XXIII | 86 | 54.0 | 150 | 1026 | — 3.4 | + 0.4 | — 6.9 | — 2.0 | — 9.7 | — 9.9 |
| XVIII | 84 | 50.2 | 146 | 1015 | — 1.6 | + 3.2 | — 6.0 | + 0.3 | — 6.3 | — 7.9 |
| XIX | 84 | 43.9 | 158 | 1045 | + 6.5 | + 6.2 | + 4.4 | + 7.2 | — 3.5 | + 1.4 |
| XX | 84 | 44.5 | 144 | 1070 | + 8.5 | +16.2 | + 5.7 | +12.2 | + 5.6 | + 3.2 |
| XXI | 84 | 45.4 | 151 | 973 | — 2.0 | + 1.0 | — 4.9 | — 0.3 | — 8.2 | — 7.1 |
| XXII | 84 | 63.3 | 147 | 966 | —15.0 | —11.3 | —18.7 | —15.3 | —19.4 | —21.9 |
| XVI | 81 | 40.6 | 152 | 961 | + 0.6 | + 1.8 | + 0.4 | + 1.6 | — 5.9 | — 3.4 |
| XVII | 81 | 66.9 | 147 | 1035 | —11.2 | — 8.9 | —16.7 | —12.8 | —15.7 | —19.0 |
| C | 80 | 62.4 | 144 | 1223 | + 8.3 | +12.7 | + 4.3 | + 6.9 | + 1.6 | — 1.1 |
| D | 79 | 37.9 | 153 | 938 | + 0.5 | + 1.3 | + 2.1 | + 0.8 | — 8.2 | — 2.8 |
| XV | 79 | 69.2 | 151 | 1049 | —11.4 | —11.4 | —17.8 | —14.5 | —19.7 | —19.5 |
| XIV | 78 | 41.6 | 145 | 973 | + 1.0 | + 3.7 | + 0.9 | + 1.8 | — 5.5 | — 3.9 |
| XIII | 77 | 31.8 | 138 | 799 | — 9.6 | — 1.8 | — 1.2 | — 6.4 | — 9.9 | — 9.9 |
| XII | 76 | 49.4 | 152 | 1148 | +12.0 | +10.0 | + 8.4 | + 8.9 | + 1.4 | + 3.7 |
| E | 75 | 68.0 | 159 | 1265 | + 7.6 | + 1.4 | ± 0.0 | + 1.3 | — 6.1 | — 2.8 |
| F | 75 | 55.1 | 164 | 1292 | +20.6 | +10.8 | +15.8 | +13.8 | + 2.7 | +10.3 |
| X | 74 | 63.0 | 149 | 1122 | — 1.1 | — 3.1 | — 5.3 | — 5.5 | — 9.8 | —10.6 |
| XI | 74 | 44.7 | 159 | 936 | — 5.3 | —11.4 | — 6.7 | — 9.2 | —17.4 | —11.5 |
| 51 | 74 | 48.9 | 164 | 1095 | + 7.2 | — 1.8 | + 4.7 | + 1.4 | — 8.5 | — 1.0 |
| G | 73 | 62.3 | 162 | 1077 | — 4.5 | —12.5 | — 7.5 | —10.9 | —18.1 | —13.8 |
| IX | 73 | 64.0 | 157 | 1318 | +15.4 | + 7.7 | +10.8 | + 8.4 | + 0.9 | + 4.1 |
| 95 | 73 | 71.1 | 159 | 1411 | + 9.0 | + 9.3 | + 6.5 | + 9.5 | + 2.4 | + 5.7 |
| H | 72 | 44.0 | 160 | 966 | — 1.6 | — 8.8 | — 3.5 | — 6.7 | —14.1 | — 8.3 |
| J | 72 | 81.0 | 167 | 1549 | + 9.2 | + 9.2 | + 2.7 | +10.5 | + 2.9 | + 8.5 |
| V | 71 | 72.0 | 159 | 1501 | +15.0 | +14.6 | +11.8 | +14.9 | + 8.3 | +11.2 |
| VI | 71 | 63.7 | 153 | 1149 | + 0.8 | — 4.7 | — 3.7 | — 5.5 | — 9.9 | — 9.5 |
| VII | 71 | 66.6 | 168 | 1323 | +13.8 | + 0.4 | + 7.0 | + 4.1 | — 5.1 | + 2.0 |
| VIII | 71 | 53.0 | 156 | 1096 | + 4.0 | — 3.1 | ± 0.0 | — 2.1 | — 8.4 | — 5.3 |
| III | 70 | 72.1 | 157 | 1401 | + 7.3 | + 7.6 | + 4.3 | + 7.1 | + 2.2 | + 3.6 |
| IV | 70 | 52.4 | 150 | 1112 | + 6.0 | + 1.2 | + 1.9 | + 0.5 | — 3.9 | — 3.6 |
| K | 69 | 49.7 | 156 | 1042 | + 1.4 | — 6.3 | — 2.3 | — 4.9 | —13.1 | — 7.4 |
| II | 68 | 70.9 | 154 | 1359 | + 5.3 | + 5.0 | + 3.2 | + 4.6 | — 2.0 | + 1.0 |
| I | 66 | 50.3 | 159 | 931 | — 9.8 | —19.2 | —13.1 | —16.9 | —24.0 | —18.3 |
| 99 | 66 | 55.9 | 162 | 1150 | + 6.8 | — 6.0 | + 3.0 | — 2.6 | —11.4 | — 4.2 |
| Average with regard to sign | | | | | + 2.2 | + 0.1 | — 0.9 | — 0.2 | — 7.4 | — 4.7 |
| Average without regard to sign | | | | | ± 7.1 | ± 6.8 | ± 6.3 | ± 6.7 | ± 8.9 | ± 7.7 |

PREDICTION OF THE METABOLISM IN OLD AGE

Several methods of predicting the basal metabolism of human beings of different ages and sexes are in common use, notably those of Aub and Du Bois[1] and Harris and Benedict[11] and to a less extent Dreyer[9]. The application of these prediction methods in the case of elderly women is worth consideration, with the prime object of determining which of the methods will in all probability predict most closely the metabolism of an elderly woman whose age, weight, and height are known. In addition to these three commonly accepted methods of prediction three other methods applicable to women sixty-

six years of age and over (based upon critical analysis of our data on elderly women) are suggested. These are specifically (1) the use of an average value for the *total twenty-four hour basal heat production* with corrections of this value for over- and under-weight, (2) the prediction of the heat production per square meter of body surface according to age by use of the curve shown in figure 2, and (3) the prediction of the heat production per kilogram of body weight according to weight by use of the curve for elderly women shown in figure 3. The pertinent data are shown in table 4, the Roman numerals representing the subjects studied by Benedict and Meyer, the Arabic numerals those reported by Harris and Benedict, and the capital letters those in the Bangor series.

*Use of an average value for total heat production with corrections for over- and under-weight.* As brought out in the discussion of figure 1, there is a tendency for the *total twenty-four hour basal heat production* of women beyond seventy-eight years of age, irrespective of age within the age range here considered and irrespective in large part of body weight, to be not far from 1000 calories. This value may be considered as the irreducible overhead charge of living. When we consider the various factors that influence the magnitude of the total heat output of the day, such as muscular activity and vigor, it would appear as if with these women showing a total heat production of about 1000 calories we are dealing with individuals who closely approximate a non-productive or vegetative existence. These women have all accomplished their life's work, so to speak. Growth, reproduction, and sex activity have ceased, and they are living quietly under conditions calling for the lowest total heat production. These elderly women were not all of the same body weight, it is true, and it has already been pointed out in the discussion of figure 1 that those women having the highest total metabolism were for the most part over-weight, whereas those having a very low total metabolism were for the most part those with low weights. Nevertheless there is a hint in these data that for every adult woman who has ceased all vigorous physical activity and who is not excessively over- or under-weight there is a basic cost of living of approximately 1000 calories. Although this suggestion is derived from data for women over seventy-eight years of age, there is no particular reason why it might not apply also to women under this age. As a matter of fact, there are among our elderly women eleven ranging in age from sixty-six to eighty-eight years, having an average body weight of 50 kg. (range 44.7 to 54.0 kg.), and an average height of 154 cm., whose total twenty-four hour heat production averages 1030 calories. Accepting tentatively a baseline of 1030 calories for elderly, 50-kg. women, we have predicted the total twenty-four hour heat production of our elderly women by arbitrarily increasing this value by 8 calories for each kilogram in weight in excess of 50 kg. up to 70 kg. and by 12.5 calories for each kilogram in excess of 50 kg. for women of 70 kg. and over, and have decreased it by 8 calories for each kilogram of weight below 50 kg. These arbitrary corrections for weight are based upon inspection of the magnitude of the values for the actually determined heat production of those women above and below the standard weight of 50 kg. The percentage deviations of the actually measured metabolism from the metabolism thus predicted are shown in the sixth column of table 4. The average deviation with regard to sign is + 2.2 per cent and without regard to sign, ± 7.1 per cent. In such a consideration the age factor within this group does not appear. The age factor probably decreases in importance with advancing age after sixty years, as shown by the curves in figure 3.

The importance of this particular analysis is not that it furnishes a method of prediction so much as that it introduces the idea of a basic minimum requirement of energy for a woman of average size in advanced age, when vigorous physical activity has ceased and the existence is approaching a vegetative one, and suggests a means of computing the probable correction of this basic value for either over-weight or under-weight. We are supported in our judgment that such a conception is by no means illogical by the finding with eleven groups (twelve girls per group) of Girl Scouts[5] that the total twenty-four hour heat production while the girls were asleep was 1250 calories, irrespective of age between twelve and eighteen years and irrespective of weight between 39 and 58 kg. For comparison with data obtained under waking conditions this value should be increased ten per cent to correct for the influence of sleep, thus becoming 1375 calories. The Girl Scout data were not obtained, however, on a homogeneous group of individuals, since there was a range of six years in the ages and of 19 kg. in the average weights. Hence the seeming constancy in the average metabolism of the Girl Scout groups is probably the resultant of two opposing factors, age and growth. Young children have a high, intense metabolism. This intensity in metabolism decreases as age advances. The decrease is rapid during adolescence and slower at the older ages, but nevertheless it is continual as age progresses. Opposing this decrease in metabolism with age is the increase with growth. The larger and heavier the organism, the larger the total heat production. During the growth or the increase

in weight characteristic of youth, therefore, there would normally be an increase in total metabolism. Hence in the case of the Girl Scouts the age effect (decrease in metabolism) is probably compensated by the growth effect (increase in metabolism). With the elderly women over seventy-eight years of age the factor of growth is absent, in spite of rather large weight differences (chiefly differences in fat), and the age factor as such at this advanced age plays a very small rôle.

Results of studies by other investigators on girls of essentially the same ages as our Girl Scouts show values for *total twenty-four hour heat production* approximating the corrected average of 1375 calories for Girl Scouts. Thus the similarity of results for the subjects of Bedale and MacLeod has already been commented upon in a publication from the Nutrition Laboratory[2]. McKay[18] found variations due to over- or under-weight amounting to ± 8 per cent of the average heat production for the entire group, but the average for each age group differed little from the average for the entire group, namely, 1364 total calories per twenty-four hours. Of the student nurses measured by Remington and Culp[21] forty-eight who were between seventeen and twenty years of age had an average total heat production of 1320 calories. Stark[22] reports an average total heat production of close onto 1300 calories for 134 girls between seventeen and twenty years of age studied at the University of Wisconsin, although there was considerable variability in the individual values, as would be expected, due to abnormalities in weight and height. Coons[8] finds with 101 women between seventeen and thirty-nine years of age an average total heat production somewhat lower than those values just cited, namely, 1245 calories, but here again the average values for the different age groups, at thirty to thirty-nine years as well as at seventeen years, are close to the general average, the range being only from 1217 to 1284 calories.

Approximate constancy in total heat production has also been noted with a group of twenty-seven Tamils in Madras, India[16]. These women ranged in age from seventeen to thirty-one years (average age, twenty-one years), in weight from 37.2 to 67.6 kg., and in height from 145 to 166 cm. Notwithstanding the lack of homogeneity in this group the total heat production per twenty-four hours ranged with only five exceptions within ± 10 per cent of 1000 calories, averaging 1048 calories. That this low value cannot be ascribed to undernutrition is evident from their pelidisi, which averaged 98 and in no instance was under 92, so that judged by Caucasian standards these women can be considered to have been in a good nutritive state. For fifty Japanese women, also in a good nutritive state judged by their pelidisi, ranging in age from fifty-four to eighty-six years, in weight from 29.0 to 55.0 kg., and in height from 127 to 152 cm., Kisé and Ochi[13] report values for the total twenty-four hour heat production (with eleven exceptions) likewise within ± 10 per cent of 1000 calories.

If we compare only the average total heat production of the young Caucasian girls and the elderly Caucasian women, leaving the Tamils and the Japanese women out of consideration for the moment because of the complication of the racial factor, we can say that the difference between the 1030 calories noted on the average with the elderly women and 1375 calories noted, for example, with the Girl Scouts is a definite index of the greater intensity of the metabolism of youth. When the factors of growth and age (which are so prominent from birth to about twenty-five years of age) are eliminated, as they are in old age, then there is a tendency for the total twenty-four hour metabolism to be constant at 1030 calories, except in those instances of great irregularities in body weight such as occur in the early and middle stages of old age. A fairly reasonable correction for these gross deviations in weight has already been suggested (see page 1117, last line, first column).

An ideal test of the degree of accuracy of this method of prediction, derived from our data on elderly Caucasian women, would be to apply it to another series of measurements on a different group of women. Fortunately among the Japanese women studied by Kisé there are thirty-six who are within the same age range as our elderly Caucasians, namely, from sixty-six to eighty-six years of age. These thirty-six women weighed on the average 37 kg., or 13 kg. less than the 50-kg. standard for elderly Caucasian women. Hence if the prediction standard of 1030 calories derived from analysis of our Caucasian data is applied to these Japanese women, it should be lowered 104 calories (13 times 8) to correct for the difference in weight. The average predicted total heat production of the Japanese on this basis would therefore be 926 calories. As a matter of fact, their actual total heat production averages 941 calories. If we predict the metabolism individually for each of the Japanese women sixty-six years old and over from the standard value of 1030 total calories, with a correction of —8 calories per kilogram for differences in weight under 50 kg., we find that on the average the measured metabolism deviates from the prediction by + 1.1 per cent or (considering the deviations without regard to sign) ± 7.3 per cent. The measured metabolism of these Japanese women is thus close to the prediction standard derived from the Caucasian data.

Stress is laid upon this comparison not with the idea of presenting a superior method of prediction for the average elderly woman, the metabolism of whom may be subsequently measured for comparison, but with the idea of emphasizing the conception that for women of the older ages above sixty-six years the energy requirements for the carrying on of physical activities when the body is approximating a vegetative state are at a constant, low level. Indeed, it might be considered that the basic daily energy requirement of every woman is 1000 total calories, that at the older ages there will be an addition to or a subtraction from this basic need for gross over- or under-weight, and that at younger ages there will be a further addition for the greater energy needs ascribable chiefly to the factors of age, growth, and the greater physical activity characteristic of youth.

This conception to some extent takes into account, in the case of the elderly women (in the suggested correction of the basic level for differences in weight from an average of 50 kg.), the proportion of fatty tissue present. It probably does not, however, attach sufficient importance to the factor of height or, since muscular tissue is roughly correlated with height, to the proportion of muscular tissue or body nitrogen. With elderly women, especially beyond seventy-eight years of life, the variability in weight would be within a reasonable range and the excessive fatty tissue which is present in many women even up to seventy years of age would in the majority of instances have disappeared. Furthermore the deviation from an average height would not be great with women, but with men the deviations in height would play a larger rôle. On the assumption that nitrogenous tissue is proportional to muscular tissue, we might argue that the larger the skeleton the more muscular tissue there would be in general, and consequently the more nitrogenous tissue. If the nitrogenous tissue is the metabolically active agent, then the metabolism would be larger the greater the amount of nitrogenous tissue. To be sure, the larger the skeleton the greater the opportunity to lay on inert fat, for the amount of adipose tissue that can be added to the skeleton is apparently unlimited. But the deposition of nitrogenous or muscular tissue in the case of the normal, nonathletically trained human being is relatively limited. If we assume that the heat-producing elements in the body are chiefly muscles and not fat and if we assume that the larger the skeleton, the larger the muscles, then probably we should disregard entirely weight as such, for weight means a combination of skeleton, muscles, and fat of which two are presumably metabolically inert. Consequently in any further studies of the total metabolism we should be particularly on the lookout for any possible correlation between the height of the individual and the total metabolism.

Ideally, for further analysis of the conception put forth in the above paragraphs, namely, that in general the basic total heat production at all ages is at a constant level, other groups of elderly women should be studied under conditions such that the factors of growth, biological (including sexual) activity, and physical activity are known to be absent or to play only a small rôle. However, with just such groups we encounter more often the diseases from which human beings finally succumb, diseases which in early youth might not seriously affect the metabolism. If such diseases are present in a group of elderly people, then the total metabolism will be above or below the basic level of 1000 calories, according to the nature of the disease. Thus there may be cases of definitely reduced thyroid activity or pronounced atrophy of the muscles, which will give results below 1000 calories, demonstrating that the elderly woman is not normal. Values over 1000 calories could be explained, as we have already pointed out, by the higher energy needs of youth, of the reproductive stage, of greater physical activity or by the increases ascribable to certain diseases.

*Prediction of metabolism of elderly women from age and surface area, or from weight.* Prediction of the metabolism on the basis of the heat production per square meter of body surface referred to age automatically takes into account body weight and height. The deviations of the measured heat production per square meter of body surface and that predicted for age on this same basis from the curve in figure 2 are shown in the seventh column of table 4. The measured metabolism is on the average within ± 6.8 per cent of the predicted heat production per unit of surface area. Prediction of the heat production of elderly women per kilogram of body weight referred to weight may be based upon the full-line curve for women of sixty-six years and over shown in figure 3. By this method of prediction the deviation of measured from predicted metabolism averages for our thirty-six women ± 6.3 per cent. These two methods, based upon the curves in figures 2 and 3, are of about the same degree of accuracy (judged by comparison with the metabolism measurements from which they are derived) and predict the metabolism of these subjects more closely than does the use of the constant of 1030 calories with corrections for weights above and below 50 kg. The three prediction methods derived from Nutrition Laboratory data on elderly women must be looked upon, however, not as means of predicting the basal metabolism of this particular group of

women but simply as methods tentatively proposed for use with other groups of aged women. The true test of the accuracy or inaccuracy of these predictions can be made only by comparisons with measurements on other aged women.

*Standard prediction methods already in use.* The three prediction methods shown in the last three columns of table 4, namely, those of Harris and Benedict, Aub and Du Bois, and Dreyer, can be tested (as applied to old age) from this latter standpoint by comparison with the measurements secured on our elderly women, since they are based upon entirely different series of observations. The measured metabolism of our elderly women deviates from the Harris-Benedict prediction, on the average, by ± 6.7 per cent, from the Aub and Du Bois prediction by ± 8.9 per cent, and from the Dreyer prediction by ± 7.7 per cent. If the deviations are averaged with regard to sign, the averages show that the Aub and Du Bois standard is on the whole 7 per cent too high for our group of elderly women and the Dreyer standard 5 per cent too high. The Harris-Benedict standard, on the contrary, is on the whole much closer (—0.2 per cent) to the actually measured metabolism. The higher predictions by the Aub and Du Bois and by the Dreyer standards call to mind that Krogh[14] has suggested that the Aub and Du Bois standards should be lowered by 4 per cent. The Harris-Benedict predictions for younger women have also been considered to be on the whole 5 per cent too high[15]. In the case of these elderly women, however, it is clear that, judged from the average deviations either with or without regard to sign, the Harris-Benedict predictions meet the test of accuracy better than do the Aub and Du Bois or the Dreyer predictions. This conclusion is in conformity with the earlier deduction of Benedict and Meyer[6] based upon observations on twenty-three elderly women, and it is hardly to be expected that the picture would be materially changed by the inclusion of the relatively small Bangor group.

*Deviations from prediction greater than ± 10 per cent.* Another rough measure of the relative accuracy of several methods of prediction is obtained by comparison of the number of metabolism measurements within the group that deviate by more than ± 10.0 per cent from the prediction. For the time being giving all six methods of prediction shown in table 4 equal weight, that is, not separating those based upon data obtained on younger women from those based upon our elderly women, we find that with our group of elderly women the least number of deviations greater than ± 10.0 per cent occurs with the prediction on the basis of the calories per kilogram of body weight referred to weight, namely 8 as compared with 9, 10, and 11 by the other methods. If the limit of variability is extended from ± 10.0 to ± 12.5 per cent, then the prediction on the basis of calories per square meter of body surface referred to age shows the least number of deviations beyond this limit, 4 as compared with 5 to 9 by the other methods.

*Heat production per square meter of body surface predicted for age.* Comparison of the average percentage deviations shown in table 4 and consideration of the number of deviations greater than ± 10 per cent in the case of the several prediction methods do not indicate any marked difference in degree of accuracy of prediction between the prediction from body weight and that from age and body surface. Since the Aub and Du Bois prediction method, however, is so often used in the clinic and according to this method the metabolism is expressed in terms of calories per square meter of body surface per hour, we have as a matter of convenience tabulated in table 5 the values expressed on this same basis for the heat production of women for each year of age between sixty-six and eighty-eight years, predicted from the curve for elderly women in figure 2.

TABLE 5

BASAL HEAT PRODUCTION OF ELDERLY CAUCASIAN WOMEN PER SQUARE METER OF BODY SURFACE PER HOUR PREDICTED FOR AGE

| Age Yrs. | Calories | Age Yrs. | Calories | Age Yrs. | Calories |
|---|---|---|---|---|---|
| | | 70 | 31.4 | 80 | 29.8 |
| | | 71 | 31.3 | 81 | 29.6 |
| | | 72 | 31.1 | 82 | 29.4 |
| | | 73 | 30.9 | 83 | 29.3 |
| | | 74 | 30.8 | 84 | 29.1 |
| | | 75 | 30.6 | 85 | 28.9 |
| 66 | 32.0 | 76 | 30.4 | 86 | 28.8 |
| 67 | 31.9 | 77 | 30.3 | 87 | 28.6 |
| 68 | 31.8 | 78 | 30.1 | 88 | 28.5 |
| 69 | 31.6 | 79 | 29.9 | — | — |

## PHYSICAL AND MENTAL VIGOR AND METABOLIC LEVEL

Four of our subjects (Nos. XVII, F, V, and I) show deviations of measured from predicted metabolism greater than ± 10 per cent by five out of the six different prediction methods considered in table 4, and two subjects (Nos. XXII and XV) show deviations of this magnitude by all six methods. With each of these subjects the deviations from the different prediction standards are all in the minus direction or all in the plus direction. In an endeavor to explain these wide deviations from the general average in these few cases, we present what information has been secured regarding the physical and mental condition of our various subjects*.

*We are particularly indebted to Dr. Lyman H. Hoyt, physician in charge at the Massachusetts Home in Boston, who gave of his time to secure blood pressure records on some of these subjects in 1935 for comparison with the measurements made by him in 1932. We also wish to express our appreciation to Mrs. Ruth E. Lindon, hostess at the Massachusetts Home, for her information regarding the physical condition in 1935 of some of these subjects.

Of those whose metabolism measurements were reported in 1932, the following have since died: Subject II, 69 yrs. (shock), subject X, 76 yrs. (operation on kidneys), subject XI, 75 yrs. (fractured hip and pneumonia), subject XIV, 80 yrs. (pneumonia), subject XVIII, 86 yrs. (pneumonia), subject XX, 85 yrs. (cause ?), subject XXII, 86 yrs. (heart trouble). Of those who are still living at the Massachusetts Home in Boston, subject III at present has a chronic heart condition and edema of the ankles. Subject IV has developed a mild form of diabetes and has hypertension symptoms. Subject VI is in normal condition for her age. Subject VII has a bad heart, arteriosclerosis, and edema. Subject VIII is troubled with coronary thrombosis. Subject IX has diabetes, but it is under control. Subject XV has become much feebler physically and mentally. Subject XVI is now bedridden. She and subject XXI are in poor mental condition. Subject XXIII has had pneumonia twice and is now bedridden, due to senile paralysis agitans.

In a few instances the blood pressures were recorded for comparison with those recorded in 1932. This comparison is as follows:

| | 1932 | | 1935 | |
|---|---|---|---|---|
| Subject | Systolic | Diastolic | Systolic | Diastolic |
| VIII | 210 mm. | 110 mm. | 160 mm. | 110 mm. |
| IX | 170 | 85 | 190 | 90 |
| XII | 182 | 82 | 160 | 90 |
| XVI | 180 | 130 | 210 | 80 |
| XVII | 160 | 80 | 150 | 90 |
| XIX | 200 | 70 | 155 | 90 |
| XXI | 180 | 120 | 154 | 82 |
| XXIII | 142 | 64 | 110 | 40 |

Of the Bangor women, subject A has been troubled with gall stones for a number of years, but the trouble has not been serious enough to make an operation necessary. Both she and subject B have had only minor ailments (such as slight colds and sore throats) since 1908 and for their ages are well and strong. Their inheritance is good, with no great sickness or chronic diseases in the family. Subject C has had no family physician and is almost never ill. Subject D is poorly nourished, her eyes and arteries are senile, her hearing is faulty, her heart functions well, her digestion is poor, but she has no particular organic disease. Subject E has no family physician, is active around the house, and walks considerably. Subject F has consulted no physician for many years. Subject H is lame as the result of a broken hip and is troubled with rheumatism.

The attempt to explain the widely aberrant values of these several subjects from examination of what little information is available regarding their personal histories is only in part successful. It is regrettable that later metabolism measurements could not be secured. No clear-cut picture is shown of a correlation between muscular and mental vigor and metabolic level, except that in a few instances where the subjects have subsequently become bedridden it would appear as if the previously measured low metabolism might be explained by a tendency for ultimate muscular atrophy (possibly a cachexia). Realizing that with the majority of elderly people there is a tendency for the weight to decrease, even allowing for the naturally increasing weight in middle age, we believe that it would have been helpful to have had a record of the maximum previous weights of these subjects. It may be that the musculature had been adjusted to handling a larger mass of tissue and that some of the deviations noted from the various prediction methods may have been accounted for by the after-effect of the previous accumulation of body weight.

In view of the frailties of extreme age it would be illogical to assume that every one of our thirty-six elderly women was normal physiologically. However, we believe that from the standpoint of the emotional factor every subject was studied under ideal conditions and that the metabolism as measured was the true basal metabolism. It is practically impossible to obtain a metabolism measurement that is below basal except in the case of illness. It is easy to secure a measurement that is above basal, and it might well be that one or two in an old-age group, if studied further, would show a metabolic level other than that of the first measurements. The apparently aberrant metabolism data noted with some of our thirty-six elderly women must therefore be considered not from the standpoint of deviations from physiological perfection but rather as individual differences that may normally be expected to exist in measurements on any group of elderly people. Since there is this inescapable physiological variability with human beings, it would have been advantageous if we could have measured a much larger group of elderly women. As time goes on one can look for additional data on the metabolism in old age, under which conditions the trends of the curves in figures 2 and 3 and the prediction formulas will undoubtedly be changed somewhat. It is believed, however, that there is a sufficient number of subjects in our three series listed in table 4 for the measurements to afford a reasonable basis for predicting the probable basal metabolism of women sixty-six years of age and over, who are presumably in good health. These standards may not, however, be used for predicting the metabolism of younger women.

## SUMMARY

Supplementing earlier series of observations on elderly women and on three exceptionally vigorous elderly men, the Nutrition Laboratory

has measured the basal metabolism of five men and ten women between sixty-nine and eighty-eight years of age. The data for men are not sufficient to justify extensive analysis. The data for the several groups of elderly women, totaling thirty-six individuals, have been analyzed from the standpoint of the factors affecting metabolism in old age and the use of prediction standards in old age. The total metabolism and the metabolism per unit of surface area of elderly women tend to decrease as age increases, but marked over- or under-weight causes pronounced deviations from the general trend. The heat production per kilogram of weight decreases with increasing weights up to 64 kg., but beyond this weight the metabolism per unit of weight remains at a constant level. Younger women, on the average, have a higher heat production per unit of weight referred to weight than do elderly women up to about 74 kg., beyond which weight the metabolism per kilogram is probably the same, irrespective of age.

The measured heat production of these thirty-six women is on the average 7 and 5 per cent, respectively, below the Aub and Du Bois and the Dreyer prediction standards and 0.2 per cent below the Harris-Benedict standard. Based upon the measurements on these thirty-six elderly women, a tentative method is proposed for predicting the basal metabolism of women between sixty-six and eighty-eight years of age on the basis of the heat production per square meter of body surface per hour.

The conception is put forth that the total twenty-four hour heat production, under basal conditions, of all normal elderly women above sixty-six years of age, whose vigorous physical activities have ceased, is at a constant, low level of about 1000 calories. It is furthermore suggested that the basic daily energy requirement of every normal woman may be 1030 total calories, that at the older ages this basic requirement will be increased or decreased by gross over- or under-weight, and that at younger ages it will be increased for the greater energy needs of youth, growth, reproductive activity, and greater physical activity.

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# REPORT OF A CASE OF PRIMARY PNEUMOCOCCUS ARTHRITIS*

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THIS is a report of a case of primary pneumococcus arthritis which recently came to my attention. There are available in the literature reports of several similar adult cases which followed pneumonia; however, cases in which the origin was unknown are rarely mentioned. Plisson and Brousse[1] collected 185 cases of pneumococcus arthritis but in only twenty-six cases was the arthritis primary; of these fourteen were in children. Froelich[2] reported seventeen cases of pneumococcus arthritis, all following pneumonia. Fagge[3] presented one definite and two doubtful cases from the medical and surgical services of Guy's hospital, which occurred between 1918 and 1927. Hipsley[4] reported a case of primary pneumococcus arthritis in a child of ten years, involving both hips, the right elbow, and the left knee. The left hip showed destruction similar to that caused by Perthes' disease. Froelich reports having seen one case which showed complete destruction of the heads of both femora in an infant. Gubb[5] described a similar case of pneumococcus arthritis in a twenty-five year old man, without destruction of any joints. Bulkley[6], in a report of a series of 173 cases gathered from the literature, stated that 70 per cent were associated with pneu-

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monia. These occurred most often in children. Satisfactory evidence of the pneumococcus origin of arthritis requires the isolation of the organism in question from the joint, and positive identification. In the case here reported the organism was identified in the fluid removed from the first metatarsophalangeal joint of the left foot.

### CASE REPORT

Chief Complaint: A twenty-seven year old colored female entered the Carney Hospital on March 1, 1934, complaining of pain and swelling of the first metatarsophalangeal joint of the left foot.

The past history and family history were negative.

Present Illness: One week before admission she experienced some stiffness of the first metatarsophalangeal joint of the left foot. Two days later there appeared a swelling over this joint associated with a severe throbbing pain. She had a slight headache and felt nauseated but did not vomit. At no time was her temperature over 100°. Palliative treatment was given by her physician but the progression of symptoms necessitated her removal to a hospital.

Physical Examination: A well-developed and nourished colored female complaining of severe pain and swelling of the left big toe. The first metatarsophalangeal joint was hot, swollen and exquisitely tender. On March 2, 1934 this joint was incised. About five cc. of a thin, yellowish, flaky fluid containing much fibrin was evacuated. The joint space was washed thoroughly with a 1:2000 solution of bichloride of mercury. The joint was closed.

A report from the Boston City Hospital, Pathology Department, indicated that the fluid contained a pure culture of pneumococci, Group IV, Type 14 according to the Neufeld method.

On March 5, 1934 all symptoms having subsided, she was discharged.

Second admission: On April 21, 1934 she was admitted for pain and swelling of the left ankle. She had been well until four days before admission when she again experienced pain and swelling of her foot.

Physical examination disclosed a fluctuant area beneath the external malleolus of the left foot. There was also a fluctuant area over the bases of the fourth and fifth metatarsal joints of the same foot. All other joints were negative. Fifteen cc. of fluid, closely resembling that previously obtained from the metatarsophalangeal joint, was aspirated from below the external malleolus. On April 23 there appeared a similar swelling of the left wrist and right knee joints. The temperature from the time of the second admission to her discharge on May 5, 1934 was never over 100°. The joints gradually subsided with immobilization.

Laboratory Examination: Urine examinations were negative. On the first admission the blood examination showed 85 per cent hemoglobin (Dare), polymorphonuclear neutrophiles 77 per cent, lymphocytes 18 per cent, eosinophiles 5 per cent. On April 21, 1934 the hemoglobin was 55 per cent, erythrocytes 2,180,000, polymorphonuclear neutrophiles 79 per cent. On April 30, 1934 the hemoglobin was 60 per cent, erythrocytes 2,990,000, polymorphonuclear neutrophiles 77, small lymphocytes 21 per cent, eosinophiles 1 per cent. Blood cultures were negative on several occasions. Wassermann negative. There was no growth obtained from the fluid of the ankle. The x-rays were negative for bone pathology.

*Treatment:* On April 30, 1934 vaccine treatment was instituted, using a vaccine composed of three thousand million pneumococci and one thousand million streptococci to the cubic centimeter. An initial dose of .5 cc. subcutaneously was given which was increased to 1 cc. daily; twenty-two injections in all were given.

There is definite improvement of the joints involved inasmuch as the motion is not limited and the pain has almost completely subsided. It is, however, too early to draw any conclusions. The prognosis in these cases is usually good.

### CONCLUSIONS

(1) A review of the literature indicates that few cases of primary pneumococcus arthritis have been reported.

(2) One case is herein reported.

(3) The prognosis appears to be favorable after drainage and lavage with 1:2000 solution of bichloride of mercury.

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## THE SOCIAL TRENDS UNDERLYING HEALTH AND HOSPITAL INSURANCE*

BY STEWART R. ROBERTS, M.D.†

IDEAS are the prophets and forerunners of progress. Facts are the bricks that make the solid foundation. Ideas plan the house and arrange the rooms. New ideas may rearrange the rooms in the old house, or add to it or demolish part of it. At variable intervals certain epochs give birth to a whole crop of new ideas. The house may be torn down and a new house built on the old foundation with a new plan and emphasis. In the home of Washington's new nation slavery had a large room and the right to secede a very cozy and congenial den. For seventy-six years a new idea ran the gauntlet of truth and public opinion, nay, of morality and efficiency also. It held that the slave had a right to be free and that the nation could not con-

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tinue half slave and half free. After seventy-six years of words and four years of bullets this last idea succeeded the old idea of slavery and secession. And with it the house of the Republic was changed. These two ideas struggled with each other for four score years, or two full generations of that day.

My great-grandfather's idea of speed and transportation was that of the ox and the horse. To him a fast horse was fast speed. The steam engine and the train came and his ideas of speed withered and died. The train made a new appeal to the human mind and new ideas of speed became current. Then gradually the tracks were made better tracks and the trains larger and faster. Still newer ideas of speed succeeded old ones. The expensive, uncertain automobile on old roads came next, then better and faster automobiles on better roads, and now the 80-mile small car on concrete roads. New ideas planned better products and better products revised or killed old ideas. And then the improvement of the airplane, flying safely and comfortably at above 150 miles per hour, made a still more revolutionary appeal to our minds. Old ideas died because better ideas became true and active. It holds for all civilization, whether it be Church or State, machines or farming or business, profession or society. Socrates talked to Plato and Jesus to Peter face to face. The Indians talked with distant moving objects and smoke, Morse with his telegraph wire, Bell with his telephone wire, Marconi with his wireless, and television now sends pictures. Talk has grown from face to face to next to nothing though heard around the world.

The daughter of one generation is the mother of the next. The ideas of one generation become the progress of the next. One cannot get away from ideas that live and the elusive, vast, unseen, moving force that applies them and that we name progress. An idea is measured in terms of its efficiency. The larger idea has the larger service to the race. Facts are the foundation, ideas the plan, progress the application. Whether one be a conservative even to the last by whom the new is tried, or a progressive, or even a pioneer who makes the new, true ideas have birth, grow up and reach maturity, then prime, then old age and wither and die. They are succeeded by another generation of ideas unless an idea and its relations and applications are so valuable that they become a part of the situation under which we live and add to the law and the morals of the nation.

Love is the ocean of the emotions, the true music of mankind, but a great idea that stimulates a great service, an idea whose time and application have come, is the motivation of a generation and the dynamo of its spiritual currents. It lights all life, lifts the burdens of the poor and lowly, and builds a highway over which the benefits of science and education may flow to those who need them. Miss Perkins wisely says that the great need of the day is to construct a new bridge that can carry the accumulated gifts of science to those on the poorer side of the economic ditch. If you have been looking for the prophet of a new time, study Miss Perkins. In terms of human service she has caught the vision and is one of the world's greatest living women. Only one who has suffered much and accepted much and the quality of whose spirit is in tune with the Infinite, could have recognized her and appointed her to her high service.

Even though an idea brings new means, methods and details, it remains true, as the President wrote, that "its objectives are as permanent as human nature". Such an idea may be measured not only by its efficiency, but in other ways. One asks if its application is right or wrong. Lincoln called it "the eternal question of right and wrong". One would seek for it the approval of wisdom, prudence, good judgment, common sense, sound economics and harmony with the basic ways of human nature. And one would wish to know,—may far more than know, would wish to feel that this idea keeps to the path of human progress. Though an idea be right and though it be wise, if it meet not the last condition, it may omit from consideration any relations to society and to the good of the people as a whole. Social rights are taking a new importance and the old doctrine of human brotherhood is coming into its own.

The panic has irrigated our social concepts and made our social relations grow and assume a greater importance. Social relations are mutual relations. In the Declaration of Independence Jefferson wrote "of certain inalienable rights," that "among these are Life, Liberty and the pursuit of Happiness". "Among these"—but he mentioned but three of them. We are beginning to see others. Many of us believe that economic security for the individual and health security for the individual are also inalienable rights. There is not much liberty without some economic safety and not much happiness without some health, and not much life without both. Healthy people make a healthy society and a healthy society consists of healthy people. All this means that we are beginning to think practically with reference to each other in terms of economic safety and health safety. But one says who is doing all this and what does all this mean? Whence all this change and who caused these new points of view? What do you intend to let these people, whom you are trying to help, do for themselves? Why not let things stay as they were and let us alone to work out our several ways and destinies? The same cry

met Jesus and the same cry meets every epoch of noble change on the path of human progress. "Let us alone; what have we to do with thee, thou Jesus of Nazareth? Art thou come to destroy us?"

One says the government is doing all this, and that it will ruin us. Another accuses the politicians, another capital, another labor, another drink, another taxes, another apathy, another laziness, another communism, another the lack of character and religion. But it is not one or all of these. It came from beneath them all. It is a great time in human history. It is the great change. It is a great force and no man can tell whence it cometh or whither it goeth. Formerly in settled satisfaction we lived from year to year. Then we tried to live from month to month and now from day to day. No man knows what a day will bring. We are swimming with the stream and are up to our necks with recent floods. We have lifted anchor and are sailing as best we may for a new day. The people call it the "New Deal." It had to have a name. What are its essentials? Is it merely a variation in many emphases? Or, are we going back to simple living, to a belief in the overwhelming importance of the personality and the rights of the individual and to finer qualities of the spirit? President Graham describes the causes as follows:

"The steam, gas, electric, and oil power engines together with the world war, the world moral confusion, the world depression and the European revolutions, have accumulated such deep moving forces as to be in focus of a great historic transition with swift repercussions around the earth. From this earth much security has gone. Earlier historic transitions have been more regional in their processes and slow in their world influence. The transitions and adjustments were processes of generations and slow centuries. Social drift did not then, as now, mean swift and wide social tragedy. The vast and dynamic mechanical framework now flung around the earth gathers up wars, revolutions, depressions and unemployment anywhere and implicates men everywhere."

To understand the great changes occurring in the economic and social aspects of medical care one must at least note the five great ideas that apparently underlie the present social transition. These ideas seem to constitute the impetus of this new epoch. A little comment upon each is justifiable.

(1) There is the idea of change. Things are not going to be as they were. All human relations are in question and have come to some degree of change. Whatever *is* in these relations is subject to change. The world is now truly a stage and is shifting its scenes rapidly. Every man and every calling sees it, feels it, and wonders. The banker meets new rules and limitations, the steel company new alloys and problems, utilities new interferences, business shifts its codes and competition, the professions turn to changing ethics and economic conditions, education to more emphasis on personality and current demands for preparation, labor seeks employment and with employment grows restless, and even the farmer shifts his crops in favor of the universal good. In the twinkling of an eye the change has come. It is a forward thing, full of ultimate good. We may well go on with a great faith.

(2) There is the idea that we are shifting the emphasis from war to peace. We are tired of war. Next to love, it has been the major historical emotion of mankind. No wonder we are tired of it. Possibly there is no excuse for it except to repel invasion or to put down insurrection. It is more than hell. It is hell, and the spilling of the warm red blood of youth and destruction and bankruptcy. It is the end of safety and the negation of peace. This nation will never really prepare for war in time of peace because it is against war. We *are* a peaceful people. And then war is expensive. In ordinary times three-fourths of the national income goes to the current military establishment and for past wars. In 1931 "the entire cotton and wheat crops did not bring to the farmers of the United States half as much money as was needed to meet the costs of war in a year of peace." (E. H. Johnson.) We really do want to take the profits out of war. And then war is such a futile effort. In the last one we tried to make the world safe for democracy and instead we seem rather to have made it safe for demagogues. Furthermore, we need war money for social needs. The stream of the billions is to be diverted from bullets to folks.

(3) There is the idea that we are shifting the emphasis from isolated accumulations of great wealth among the few to greater economic security for the many. Great abilities mean great rewards. Such abilities should continue to receive proportional rewards. But just as there is a limit to poverty below which one cannot go lest he starve, so there is a limit to the large income above which one cannot go lest, in his surplus, many be deprived of actual necessities. The economic change is leveling downwards. And then we are nearly all in debt. If we pay our debts, we shall be poor for a long time. All classes have lost and suffered the world over. It is of increasing importance that the security of the poor be increased in some fair way that shall distribute the burden. We have learned at last that a budget is a thing to be balanced. We shall continue to expect the poor man and all men to work hard to do the day's work for fair pay.

(4) There is the idea that life consists of something more than the abundance of tangible things that a man owns. It seems that there is one bread for the body and another bread for the spirit. The young man who asked what he should do to be saved was told to keep the Commandments. He had kept them but we in America have not. He was told to sell his possessions and give to the economically insecure. He hung his head and would not. But most of us are in the same condition that he would have been had he sold out and given away. Most people have lost and lost heavily. We are relatively poor. The things of the spirit are calling themselves to our attention and stirrings of greatness are within us. A kind of spiritual peace is stealing over our personalities and we are learning to be content. We are slowly learning that to be poor, to be great and to be content is to have great possessions of the spirit. This adds to our personal character, which is the foundation of everything. This adds to our moral responsibility, which is the value of everything. This brings us face to face with the social needs of our fellow countrymen, our neighbors and our friends. And at the last we come to feel that each of us has a personal responsibility to make these social needs practical and available. Social needs are knocking at our doors and the days of the social miser are gone.

(5) There is the idea that science has shown its ability but that now it should show its availability to all the people. It has been strong in its triumphs. It must now be worthy in its service. We are proud of it. It has made the things that make up modern life. It is the miracle of modern times. There were only three inventions in history worthy the name up to 1765. There were the printing block, the flying shuttle and the spinning jenny. In that year James Watt invented the steam engine and the machine age started. Steam, electricity, chemistry and manufacturing have remade the world. Their comforts, benefits, labor-saving ways and conveniences are on the way to the full quota of mankind. Under the wing of science, medicine has warmed and quickened into an art so capable of necessary service that were its benefits available to all men in equal degree, perhaps it would be accorded first choice among the blessings of the day. One would like to see an electric wire and its many serviceable offsprings, a refrigerator and a bathtub in every home. But were it left to the average parents, they would rather be assured of ever ready and adequate medical care. The father said, "I can work and sleep and be well until I put my hand on the baby's face and feel it burn." How to get adequate, available, medical care to all the people is certainly among the first of the chief social needs of the day.

What is this service that we call medicine? What kind of power is this vague beneficence we feel to be resident in every well-trained physician and public health official? Medicine is a three-in-one union of science, which is a huge system of classified and accumulated knowledge, daily increase; an art, whose essence is action in terms of symptoms, signs, treatment and prognosis; and a public function, whose essence is service to all the people in terms of health and the prevention of disease. Its science is the knowledge, its art the practice, and its function the prevention of disease. Its colleges teach the science and show the art; its physicians largely devote themselves to curing or comforting the sick, and its public health officials to preventing and controlling disease. The profession has assumed two facts in its relations with the public. (1) That those who are able to pay a fee for medical service should pay, with due consideration to ability to pay, to the value of the services rendered, to the results attained, and to the time and skill of the physician. (2) That those who are unable to pay should nevertheless be treated free. The public has assumed, in turn, two facts in its relation with the medical profession. (1) That any sick person anywhere at any time is entitled to adequate medical care. (2) If the person can pay for his medical service he should do so; but if he cannot pay, the physician himself should assume the burden of free care and by so doing relieve both the individual and the community of further obligation. It has been both the obligation and the education of the physician to every individual, without consideration of the economic condition of the patient. "Pay if you can—free if you cannot" has been the silent slogan of a silent profession.

These relations developed in an older day when communities were rural and very small, when the neighbors were known and want was scarce because the farm was the home. Medical service was cheap. The physician had a brief and inexpensive medical education and usually no hospital experience, his overhead consisted mainly of a horse and his keep, his saddlebags and their contained medicines, and a very occasional new book and medical journal. He treated the clergy free because the only clergyman he knew was apt to be his pastor. He treated his professional brethren free because there were so few of them and it was both his duty and his honor. He was king in his own right by virtue of his character and his service, and king of pain and confidence as well. He was nurse and keeper of the nightly vigil and friend of every man. His patients called him "Doc" and his God called him home when he died.

In the early days of Cincinnati, a call was

twenty-five cents though the medicine was usually fifty cents to a dollar. The fees in Cincinnati now are many, many times more. The fees of the best physicians there and elsewhere are so high that the poor people cannot pay them at all, though these same physicians give their services free in the city hospitals. But what strides medicine has made and what a story it can tell between 1820 and 1935! The doctor in 1820 had neither stethoscope, thermometer nor hypodermic needle. There were no anesthetics, a very rare hospital, no knowledge of the cause of disease, no bacteria, no sera, no laboratory, no x-ray, no radium, nothing but observation of the sick, empirical remedies largely, and prayer. Vaccination against smallpox was the only scientific preventive measure known. The first case of appendicitis described was by Daniel Drake in Cincinnati, in 1837, and that was discovered after death at autopsy. It was fifty years later before Reginald Fitz in Boston showed appendicitis to be a clean cut disease and capable of early diagnosis, operation and recovery. Before that, the patient had "locked bowels" and when he died, the minister said that "God had taken him in his own good time". Thus in a thousand ways has modern medicine grown and become expensive. The old medicine was cheap because it was not much medicine.

Contrast the automobile doctor with the doctor of the saddlebag era. He has had two to four years of college before he could even be admitted to the medical school, then four years in medical school at an expense averaging a thousand dollars a year, then a fifth year in hospital. He is from twenty-four to twenty-eight years of age before he can begin to practice and then the empty, waiting years. There is his car, its upkeep and depreciation, his office equipment, instruments, books, medical journals and societies. When the doctor leaves to attend a medical meeting everything stops but the overhead. The merchant leaves the store but the trade goes on. The doctor remembers all the work that cannot be paid. He may get accustomed to that in a languid way. Then there are reasonable bills that cost toil and loss of sleep and weariness. His human nature thinks of the callous publicity of the patient who rides in the shining new car and leaves his bill for pain unpaid. And before he knows it old age is near, both his strength and his income decrease, and he wonders whether some other economic plan might not be better.

In 1931 one half of all the physicians in Michigan received an income of less than $2500.00. In Georgia it is estimated to be less than $2000.00 for that year. These are gross incomes and the overhead must be deducted. This usually amounts to 20 to 50 per cent. In the peak of the boom, 1929, one half of the physicians in the United States earned $3800.00 or more and the other half less than $3800.00. For every physician with a net income of $10,000 or more, there were two with a net income of $2500.00 or less. In that year, the net income of dentists averaged $3,000.00. The average doctor and dentist seem rather to be underpaid. No solution of the problem of the costs of medical care can come by reducing the income of the doctors and dentists.

Medicine ranks about fifth in the business of the country in the point of annual expense, money invested, and people engaged. For 1929 it cost about $3,650,000,000. In recent years it is probably not half that amount. Tobacco, toilet articles and recreation cost $5,800,000,000, and automobiles and travel $9,475,000,000. Medical expenditures seem to be from 2 to 4 per cent of the national income. The total investment for hospitals, and medical and dental services is $5,850,000,000. For every dollar spent for medical service 29.8 per cent goes to physicians in private practice, 23.4 to hospitals, 18.2 to drugs, 12.2 to dentists, 5.5 to nurses, 3.4 to cultists, 3.3 to public health, and 4.2 to all others. Something over one million people furnish medical, dental, nursing, hospital and drug services to the American people. Seventy-five million or 60 per cent of our people probably have an annual income of less than $3,000.00, 46,000,000 or 27 per cent between $3,000.00 and $5,000.00 annually and 3,750,000 $5,000.00 and over.

Medical costs are unexpected, unpredictable, uncontrollable, and come as unbudgeted emergencies. "Between the physician, dentist, nurse, or hospital, able and willing to provide service, and the person who needs it stands a barrier compounded of ignorance and inability to pay." (Wilbur.) Families with an income of $1200 and under average $49.00 per year for medical care; $1200 to $2000, $67.00; $2000 to $3000, $95.00; $3000 to $5000, $138.00; $5000 to $10,000, $249.00; and $10,000 and over $503.00. But it is the serious illness and the long illness that drain the family. One family had a son with a serious disease of the nervous system that lasted three years and cost $12,000. The third year another son with an annual income of $3,380.00 had two running ears, two mastoid operations, two physicians and two surgeons from January 1934 to January 1935 at a total expense of $1950.00. His illness used up his savings and his income. He borrowed $400.00 from his brother and still owes a balance to his physicians. He gave up his position on account of his illness.

A school teacher had influenza and pneumonia with loss of salary for two months. Her total bill was $1,000.00—nearly equal to her annual income. While she was in the hospital her old mother and her old aunt sickened and died and their medical, nursing and funeral

expenses were added to the dilemma. The average Georgia tenant farmer has an average cash income of $350.00 per year, or less. He has no State Hospital and medical expenses mean simply taking the necessities of life away from his family.

It is estimated that in the rural South as a whole, from the Potomac to the Rio Grande, 60 per cent of the white population and 90 per cent of the Negro population receive inadequate care. How many families in Clarke County can afford to pay a nurse $42.00 per week for several weeks, or a physician a fee for a long illness, or a hospital bill even for two weeks, without a blow to the family finances? A young business woman at an annual salary of $1500.00, was confronted with the support of herself and her mother, and suddenly a younger brother was run over by an irresponsible automobilist. The boy worked for $5.00 per week. He had a job and the City Hospital would not take him as a charity case, but his hip bone was crushed and he needed an orthopedic surgeon. He had numerous x-rays, forty-two days in the hospital at $3.00 per day and six months out of work.

Dental work is said to be twenty years behind. Poor people with the toothache can either suffer or have the tooth extracted. A school teacher paid in 1934, $100.00 for dental work, and in January, 1935 was confronted with another bill of $225.00. But all her teeth could be extracted, a magnificent set of thirty-two in a young woman of twenty-eight for $50.00.

One says, how can these things be? This economic condition is not the fault of the medical profession or of the dental profession, or the nursing profession, or the hospitals or of the people. The Endicott Johnson shoe factory in New York State furnishes its 20,000 employees complete modern medical, dental, nursing, x-ray and laboratory service at a cost of $21.81 per year. The Emory University Hospital is now furnishing to recommended applicants twenty-one days of ward hospitalization for $10.00 per year and thirty-one days for $12.00; and for patients desiring private rooms all hospital services except x-ray, a twenty-one day annual limit for $12.00 and a thirty-one day limit for $14.00. Eighty-five of the largest industries and corporations in Atlanta have already taken membership. In one office after a matter was presented, 200 or 250 people subscribed at once. The Baylor Hospital in Dallas, Texas furnishes this hospital service at $9.00 per year.

What does all this mean? It means that the average family in the low income group can no longer pay for adequate medical and dental care on the old fee-for-service basis. It means that any serious illness in the middle classes drains the family income to the uttermost. It means that medical services must compete with every other form of salesmanship known, radios, movies, recreation, automobiles, education, insurance, clothes and food. "Bear ye one another's burdens" is an economic command applied in fire, light, accident and all other forms of insurance in this country except health insurance. Forty-one countries of the world have such health insurance. Indeed, the United States is the only one of the leading countries in the world without it. There is practically no important opposition to the principles of health insurance in any of these countries. There are efforts to improve the service and change the details but no effort to repeal the law. Health insurance for the low-income classes is a necessity, if they are to receive adequate medical care and if the physicians and dentists who practice for them are to be paid. For this large group of our population, the present situation is a social and economic wilderness.

In every country in which health insurance has been instituted, the medical profession has fought it. It has been so in this country. The American College of Physicians, The College of Surgeons, The State Medical Association of Michigan, and the Canadian Medical Association, all approve of health insurance or the prepayment plan of medical care. Organized medicine in America has been against it. It fears political control, the control by third-party profit-seeking groups, and a decrease in the quality of medical care. The rank and file of the individual doctors are more and more in favor of it for the low income groups. Here, at least, a beginning can be made. In the medical profession and the dental profession are two different groups with different points of view. One group is the older group who are individuals by habit, by thought and by action. They fear change, though they expect it. The younger group not only expects change, but desires it. They are younger, more vivid in their point of view, more realistic of the difficulties of the present, more economically needful of the change, and more socially minded. The people, no matter how poor, are going to receive adequate medical care. Compulsory health insurance is necessary. The cost may be large but it can be borne partly by the individual, partly by the employer, and partly by the government.

Medicine has hardly begun. With health insurance all may receive adequate medical care. The hospitals will be filled, the doctors and dentists busy, and the overhauling and renewal of health will be a social habit. It is cheaper than battleships, bigger than war and valuable beyond compute. Medicine does not belong to the profession but to the people. The profession keeps the Covenant and guards its Ark. Its members are the priests of the inner sanctuary who minister to human suffering. And the

laborer in the medical and dental vineyard is worthy of his hire. But medicine belongs to the people. It is a service for all people everywhere. The Negro plowing in the river bottom is as much entitled to adequate medical care as an inalienable right as any of us. The expectant mother in a two-room cabin has an inalienable right to adequate medical care. The opposition to it will be ultimately as helpless as a small canoe in a great storm on the open sea. What is best for everybody is best for medicine. When the time of a great idea and the time of a great social service unite, progress is inevitable and opposition helpless.

# MEDICAL PROGRESS

## PROGRESS IN ANESTHESIA IN 1934

BY RUSSELL F. SHELDON, M.D.*

THE field of anesthesia is constantly broadening. Research in almost any branch of medicine may bring to light factors that are of great concern to the anesthetist. For example, at first glance the carotid sinus would seem to be totally devoid of relationship to anesthesia, yet this mechanism of blood pressure control has brought not only new interest, but extremely practical knowledge in the handling of anesthesia. Similarly, studies in pathology, especially of the liver, become of great concern to the anesthetist, since that organ has been shown to be all-important in the detoxification of some anesthetic drugs.

As is usual, a very voluminous mass of material has appeared in the 1934 literature. By necessity a great deal of it, including some of the best, may not even be mentioned in a review of this nature. The effort has been to bring out a contemporary cross-section as outlined in the publications appearing in 1934. Yet as in previous years a complete résumé of anesthesia can readily be found, even should the work of all previous years be destroyed.

For the administration of any drug by *inhalation* the first requisite is a knowledge of the physiology of respiration. Wright[1] gives a complete picture of this phenomenon, including the newer work on the carotid sinus. As a corollary, Moncrieff[2] discusses the failure of respiration. Taken together these articles form a base for all inhalation therapy.

But anesthesia is usually associated with surgery. Therefore the problems of surgery become in part those of the anesthetist. What is shock? For the modern answer to this question a series of articles in *Annals of Surgery* provides authoritative information[3, 4, 5]. A further study by Blalock[6] should supplement this trilogy. Kemp[7] discusses the importance of the time factor in the development of shock, particularly during operation, thus bringing the problem directly to the anesthetist. What is status lymphaticus? What is allergy? Is there any relation among these phenomena? Interesting discussions on these subjects are given by Waldbott[8] and Symmers[9], with some experimental work on guinea pigs by Lugli[10].

The study of postoperative pulmonary complications is of interest to both surgeon and anesthetist. In this connection should be mentioned the studies of Griffiths[11], Robertson[12], and Vance[13]. The controversy on the value of carbon dioxide in prevention continues. Beecher[14], in a small series of cases, finds this hyperventilation to be of little or no effect in the aeration of the lungs.

The problem of asphyxia, in the new born, during operations, and after trauma, has received a great deal of emphasis. Attention is called to a special asphyxia section of the *New York State Journal of Medicine* for August 1, in which articles by Flagg[15], and Jackson[16] deserve special mention. The clear description of the "lingual check valve" in the latter paper should be studied by every practitioner of medicine, regardless of his specialty. The point is made that one of the elements in the superiority of the Schäfer over the Sylvester method of artificial respiration is due in part to gravity; the tongue cannot fall back. In the description of the technique of intubation he enters directly into the field of anesthesia. "The chief thing to remember is that the patient's head must be suspended by the spatula (of the laryngoscope) i.e., the patient is hung up on the cylindric part of the instrument." In conjunction with this article, Sise's[17] clear description of the full technique of intratracheal anesthesia is a valuable aid. To facilitate introduction and to promote security in action Woodbridge[18] has designed a new flexible metal tube.

Resuscitation by drugs has been in general disappointing. Palinaesthesia[19], offered by MacGilvra[20], by dilute hydrochloric acid intravenously, has not stood the experimental tests in animals, as shown by Shambaugh and Boggs[21]. Coramine has been recommended by some, alphalobelin by others[22], but in general drugs seem about the equivalent of the "lift from a Camel," in both of which nicotine (or its derivatives) is the active factor[23, 24]. But for a complete pic-

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ture of resuscitation Henderson[25] offers a study well worthy of perusal.

Some items of general interest are deserving of mention. Crampton[26], Lahey[27], and Crile[28] give interesting as well as practical observations, and for a detailed encyclopedic summary, anesthesia in a nut shell, Wiggin[29] has produced a compendium of knowledge. One sentence from Crampton[26] is worthy of direct quotation. "Personality is non-toxic, and does not throw any strain on the heart, liver, or kidneys, nor does it depress respiration." This article should be read by all anesthetists.

Reports on the newer anesthetics, cyclopropane, and vinethene are increasing. But the pioneer demonstrations of Waters[30] are recognized by all. Amplification by animal experimentation is offered by Shackell and Blumenthal[31]. From Canada come reports from Bourne[32, 33] and Griffith[34], and from England from Sykes[35]. The most complete reports on vinethene are given by Goldschmidt and his coworkers[36] and Bourne. The latter emphasizes the value of both in obstetrics[33, 37].

The cyanosis in nitrous oxide oxygen anesthesia has received intensive study by Raginsky and Bourne[38]. The necessity of the use of ether in sealed half pound tins, as supplied by the manufacturers, is questioned by Gold and Gold[39], who stress the similarity in quality and great diminution of expense when, for hospital use, large containers of U.S.P. ether are bought, and the daily supply metered out by the pharmacist. "Why pay 62¢ a pound when equal quality may be obtained for 11¢?"

Explosions of oxygen ether machines are reported by two German authors, Schultz[40] and Jordan[41], with comments on static by Schröder and Neeff[42], who recommend complete grounding as well as control of humidity.

The use of the soda lime filter, especially by the circuit method, is increasing, but Poe[43] is not convinced that its universal adoption is desirable.

Gettler[44], from the medical examiner's viewpoint, describes a micro-boiling point method for the detection of ether in the tissues. Examples of the importance of such a test in medico-legal cases are given. Another study of fatal cases is worthy of attention. Purks[45], from the Peter Bent Brigham Hospital, found that after 1600 operations on non-cardiac patients there were sixty deaths, but with cardiac patients there were sixty deaths in 494 operations. Congestive failure was not found to be significant as a cause of death. "The cardiac group differs from the non-cardiac group chiefly in the presence of fatal coronary occlusion and in greater incidence of fatal pulmonary complications, chiefly infarction and pulmonary embolism."

Guedel and Treweek[46] show a very ingenious production of ether apnea, or as named by Woodbridge, passive respiration. "With an ether anesthesia technique in which the blood carbon dioxide and oxygen are under control, respiratory paralysis becomes not an accident to be shunned, but at times a favorable circumstance to be encouraged. Apnea may be produced at will. These apneas are of no advantage except that they present a quieter abdominal operating field than can be produced with the same ether saturation under other circumstances."

The barbiturates by mouth still enjoy very general use for premedication, but have not supplanted the opiates. The former are usually given as a hypnotic the night preceding the operation, the latter shortly before starting the anesthesia. The combination of amidopyrin and a barbiturate is rarely used in premedication, but a warning to eliminate entirely such use is sounded by Madison and Squier[47], who trace directly to this combination in certain individuals the development of primary granulocytopenia or agranulocytic angina.

For obstetrical anesthesia the final report of the Boston Lying-In Hospital's study of various drugs and methods has appeared[48]. For the early stages pentobarbital and scopolamine are approved, with nitrous oxide oxygen at the expulsive stage.

*Spinal anesthesia.* Although Meeker and McCreary[49] report a small series of satisfactory cases with metycaine, the trend is not toward the use of new drugs, but toward variations in method of using the previously accepted ones. With an experience of 35,000 cases, Sebrechts favors the use of 1:1500 percain (nupercain) by a technique not readily accepted by all. The needle is inserted with the patient either sitting up or lying on his side; then with the needle in situ the position of the patient is changed; and 5 cc. injected every five minutes until the desired level of anesthesia is reached. Then after five minutes, the patient is placed in position for operation. About thirty-five minutes are consumed in this procedure.

Franken[51] reports a small series of cases with "hypobaric" percain in Germany, but in this country Ehrlich[52] in New York gives a series of 150 (now 1500) cases which may be of far-reaching importance in the furthering of this technique. For a general discussion of the mechanics of spinal anesthesia, with hyper- and hypoboric solutions, articles by Babcock[53], Vehrs[54], and Bingham[55] are worthy of special study.

In intensive laboratory study of the whole phenomenon of subarachnoid block Co Tui[56] and Thompson[57] offer very painstaking works. The former as usual favors the use of ephedrin, and sees little benefit, perhaps harm, from the Trendelenburg position. The conclusions of Thompson, after experimental work on dogs, are as follows: "There is no evidence to in-

dicate that during spinal anesthesia procaine diffuses in the cerebrospinal system so far as the centers of respiration to produce respiratory paralysis by direct action. In experimental animals during respiratory paralysis following spinal anesthesia there is not sufficient procaine in the fluid of the cisterna magna to produce an effect on the centers of respiration and vasomotor control. The collapse of circulation and resultant bulbar anemia appear to be intimately associated with respiratory failure. The deficiency of circulation is the result of an extensive action of the drug on nerve elements of the filaments of the spinal cord producing paralysis of the sympathetic system and the cardio-accelerator mechanism and paralysis of costal respiration. The results of these effects are a loss of vascular tone and changes in circulatory mechanism for which changes cannot be made by the central nervous system."

Of importance, too, is Emmett's[58] study on the sequence of the blocking of nerves by procaine. Effects are observed first on the sensory, secondly, on the sympathetic, and thirdly, on the motor nerves. Due to the time elapsing by methods of measurement, it is likely that the sympathetic fibres are acted on first. On recovery, motor nerves are first, and sensory and sympathetic about at the same time.

That little demonstrable harm to the cord and its tissue is produced by spinal anesthesia is shown by Koster and Kasman[59] in a laboratory study on frogs, and in some human cases. The changes shown were transitory only, and after twenty-four hours there was no deviation from the normal. However, since there may be reactions from lumbar puncture (Schube and LeDrew[60]) Sebrechts[50] feels that these effects are less with spinal anesthesia. Accurate evaluation is difficult, and it is obvious that much time must elapse before the last word is written on spinal anesthesia.

That, however the method may be unsafe in many cases, is shown by the number of articles warning against its promiscuous use[61, 53, 62]. An excellent study on fatalities is given by Thompson[63], who found seventy-seven fatalities from 1676 anesthesias; of these sixty-nine were due to the disease, seven influenced by the anesthesia, and one directly due to the anesthesia. His conclusion is "The pronounced depressant effect produced in the circulatory mechanism by spinal anesthesia is not desirable for bad risk patients, especially those in whom a failure of circulation might be anticipated."

For urological work epidural anesthesia receives but faint praise from Hess[64]. Howley and Robertson[65], and Foulds and Douglas[66] prefer spinal, novocaine for short operations, nupercaine for long, while Onhauser[67] extols the use of caudal.

The use of avertin by rectal instillation has become less experimental, though it is likely that more deaths have occurred than are recorded in the literature. One thousand avertin anesthesias, reported by Bourne and O'Shaughnessy[68] give a representative series of surgical cases, in which there were twenty-five deaths, none of them due to the anesthetic. Watter[69] gives an interesting interpretation of avertin basal narcosis under the name of "Hypnesthesia".

The foreign literature contains much more on intravenous anesthesia by sodium evipan (evipal in this country) than does the American. In some German clinics this drug is used in nearly 30 per cent of the cases. The most complete discussion in English, based on a study of 15,000 cases is given by Killian[70]. One death is reported. An enthusiastic film, by Jarman and Abel, was shown at the anesthetists' convention in Boston in October. They emphasize the "Safety pause" of 30 seconds after 3 cc. have been given. An apparatus for its use is described by Bud[71]. Two hundred and eighty American cases are reported by Livingston, Emy and Lieber[72] and thirty Canadian by Heard[73].

The use of nerve-blocking for relief of pain, i.e., the control of pain-pathways, is a somewhat new field for the anesthetist. Ruth[74], the pioneer, reports his results.

Gas therapy is of course of interest to the anesthetist; and in a great many hospitals the responsibility for the care and use of oxygen tents is entrusted to the department of anesthesia. While the consensus of most scientists[75] is that more than 70 per cent oxygen is harmful to pulmonary tissue, Evans[76] continues to demonstrate the value of 100 per cent oxygen in human patients suffering from oxygen want. Where a mask or tent is unavailable or inconvenient, Simon[77] describes a machine for subcutaneous oxygen therapy.

For teaching and statistical purposes a system of records is essential. Such a scheme is described by Rovenstine[78]. That there is still a void in the teaching of anesthesia in medical schools, especially to graduates, is shown by a folder sent out by a firm[79] engaged in the manufacture of anesthetic gases, in which is advertised its chain of clinics teaching nitrous oxide oxygen anesthesia. The nearest one locally is in Cambridge. With the demand for instruction in the growing field of anesthesia it would seem that the recognized sources for the dissemination of medical knowledge, namely the medical schools, should undertake this work rather than a commercial organization. But for practical purposes the latter is far better than none. If the demand is not met by the schools, no objection can be raised to its assumption by others.

The theories of respiration, and the gases we know now, may be entirely inadequate for fu-

ture students. Already the rarer gases are under investigation, and a totally new concept of their importance may be developing. A preview of this future picture is given by Orcutt and Waters[80]. When better anesthetists are made, Waters will make them.

That the study of the current literature in anesthesia may be adequately covered, the Boston Society of Anesthetists has formed within its membership a reading report group holding monthly meetings, among whom no less than forty-nine journals are regularly read, and abstracts of articles on anesthesia presented. To this group the present reviewer extends his sincere thanks.

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## COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934 AND SEVEN YEAR AVERAGE

MONTH ENDING MAY 25, 1935

| Diseases | 1935 Week ending May 4 | 1935 Week ending May 11 | 1935 Week ending May 18 | 1935 Week ending May 25 | Average cases reported for week corresponding to May 25 for past seven years | 1934 Week ending May 5 | 1934 Week ending May 12 | 1934 Week ending May 19 | 1934 Week ending May 26 |
|---|---|---|---|---|---|---|---|---|---|
| Actinomycosis | — | — | 1 | — | — | — | — | — | — |
| Cerebrospinal Men. | — | 1 | 1 | — | 2 | — | — | 1 | 3 |
| Chicken Pox | 154 | 117 | 150 | 127 | 105 | 82 | 162 | 135 | 122 |
| Conjunctivitis Inf. | 3 | 6 | 12 | 9 | 3 | 4 | 4 | 1 | — |
| Diphtheria | 2 | 5 | 2 | 1 | 12 | 3 | 2 | 3 | — |
| Dysentery Bacillary | — | 1 | 2 | 1 | — | — | — | — | — |
| Encephalitis Epid. | — | — | 2 | — | — | — | — | 2 | — |
| German Measles | 261 | 248 | 268 | 266 | 41 | 11 | 2 | 3 | 14 |
| Influenza | 5 | 1 | — | 2 | 7 | 1 | — | 1 | 1 |
| Malaria | — | 1 | — | — | — | — | — | — | — |
| Measles | 1493 | 1535 | 1202 | 918 | 271 | 126 | 90 | 156 | 173 |
| Mumps | 43 | 92 | 72 | 38 | 90 | 65 | 121 | 64 | 140 |
| Paratyphoid Fever | — | — | — | 3 | — | 2 | — | — | — |
| Pneumonia (Broncho) | 37 | 27 | 22 | 15 | 24 | 22 | 19 | 23 | 16 |
| Pneumonia (Lobar) | 48 | 41 | 28 | 27 | 36 | 27 | 39 | 30 | 32 |
| Poliomyelitis | 1 | — | — | — | — | — | 1 | — | — |
| Scarlet Fever | 90 | 108 | 104 | 130 | 99 | 60 | 70 | 59 | 57 |
| Septic Sore Throat | 5 | 8 | 2 | 7 | 1 | 4 | 3 | 4 | — |
| Smallpox | — | — | — | — | 1 | — | — | — | — |
| Tetanus | — | — | — | — | — | — | — | 1 | — |
| Trachoma | — | — | — | — | — | — | — | 1 | — |
| Trichinosis | 2 | — | 2 | — | — | — | — | — | 1 |
| Tuberculosis (Pul.) | 45 | 31 | 45 | 27 | 27 | 25 | 42 | 14 | 38 |
| Tuberculosis (O. F.) | 2 | 1 | 2 | 4 | 4 | 4 | 2 | 2 | 4 |
| Typhoid Fever | 1 | — | 1 | 1 | 1 | 3 | — | 1 | 1 |
| Undulant Fever | 2 | — | — | 1 | — | 1 | 1 | — | 1 |
| Whooping Cough | 62 | 58 | 64 | 65 | 65 | 59 | 57 | 35 | 60 |
| Gonorrhea | 31 | 36 | 25 | 18 | 34 | 23 | 20 | 23 | 28 |
| Syphilis | 72 | 55 | 50 | 47 | 43 | 64 | 42 | 40 | 44 |

Remarks: No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years.

# CASE RECORDS
## *of the*
# MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.

## CASE 21241

### PRESENTATION OF CASE

A sixty-eight year old retired American nurse entered because of cough and fatigue.

Five years before admission she awoke one night and found herself wheezing and out of breath. She had to sit up in bed for about an hour. Following this attack she rested in bed for two weeks. At about this time she had a feeling of hyperesthesia in the left arm, a condition which never completely cleared up. Nine months before entry she had a similar attack of shortness of breath which was associated with cough without sputum. At that time a physician found auricular fibrillation with the rate of 160 at the apex and put her on digitalis. This is the only other attack she had until admission. Recently she complained of fatigue and slight nausea. She had lost thirty pounds in weight during the past year. On the evening before admission she complained of pain in the back below the angle of the right scapula. This pain radiated to the front and also to the right shoulder.

She had scarlet fever and diphtheria as a child, erysipelas at the age of nineteen and pneumonia ten years before admission.

Physical examination showed a well developed woman with evidence of considerable weight loss. The lungs were clear. The heart was enlarged to the left, the left border of dullness being 9 centimeters from the midsternal line and 2 centimeters beyond the midclavicular line. There were no murmurs or gallop rhythm. The pulse was irregular and varied between 120 and 140 at the apex. The blood pressure was 180/90. The peripheral arteries were somewhat sclerotic. There was an area of tenderness in the upper abdomen. No masses were felt. There was no peripheral edema.

The temperature was 98.4°. The respirations were 30.

Examination of the urine showed a specific gravity of 1.026 to 1.030, a slight trace of albumin and a sediment of 15 to 40 white blood cells, an occasional red blood cell and numerous bacteria. The red cell count of the blood was 4,580,000, with a hemoglobin of 70 per cent. The white cell count was 16,200, 76 per cent polymorphonuclears. The stools were negative. An electrocardiogram showed auricular fibrillation, rate 100 to 110, and a ventricular block of the left branch type.

She continued to fibrillate and on the day following admission a small area of bronchial breathing and sticky râles were heard at the right base. She was given intravenous glucose.

An x-ray film on the ninth day showed hazy dullness at the right base which partially obscured the outline of the diaphragm and obliterated the costophrenic angle. The diaphragm moved fairly well on both sides and was in normal position. The left lung and the upper part of the right were clear. The heart showed slight diffuse enlargement. There was extensive calcification of the aorta.

It was felt that there was a considerable amount of fluid at the right base but the patient preferred not to be tapped if possible. She developed a slight cough and raised small amounts of bloody sputum. Digitalis was continued but was replaced approximately two weeks after admission by quinidin. The latter, however, had to be stopped three days later because of nausea. Her auricular fibrillation persisted, the apex rate being 104 and the radial 90 on the twenty-first day. Two days later she complained of pain in her left side. The temperature was 101.4°, the pulse 125. A slight friction rub was heard in the fourth intercostal space transmitted downward to the left. It was synchronous with the heart beat but varied with respirations to the point of disappearing. The following day 14 ounces of clear straw-colored fluid was removed from the right chest. No more was removed because of cough. Her apex rate rose to 140. Two days later she continued to raise small amounts of bloody sputum. Her neck veins were very full. On the twenty-seventh day, râles were heard in the left chest. The neck veins were not distended although venous pulsations could be seen. Suddenly, after urinating, she developed a marked shortness of breath and became unresponsive. Within ten minutes she was able to move her left arm and leg only slightly. There was drooping of the right lower face and soon the entire right side of the body became flaccid. She continued to fibrillate, remained in a semicomatose condition and died four days after this last attack.

### DIFFERENTIAL DIAGNOSIS

DR. WILLIAM B. BREED: I should like to consider this as a perfectly straightforward case first and then go over it again with a view to seeing whether there is anything in the record which could lead us to make another guess.

She apparently is an old lady who had been perfectly well until the age of sixty-three, when she had, apparently, an attack of nocturnal dyspnea. Following this, while she was resting in bed, she had a feeling of hyperesthesia in the left arm, a symptom which never com-

pletely cleared up. We know from the record that she was found somewhat later (nine months before entry) to be fibrillating. The cause of this nocturnal dyspnea it seems to me might be twofold (1) some coronary disturbance without an infarct and (2) it might have marked the onset of her irregularity. I do not see exactly how we can tell which it is. I should be rather inclined to favor the former. Nine months before entry she had a similar attack of nocturnal dyspnea and at that time there was complete irregularity of the heart. She was presumably digitalized. She apparently was not in bed during this time but complained of fatigue, nausea and some congestive disturbance and had lost thirty pounds. Then the evening before she came in she had pain in the right back below the angle of the scapula with radiation to the front, also to the right shoulder. It is a little difficult to find just how severe this pain was; whether it was a respiratory pain—I think that would be of considerable importance—or whether it was so severe that she had to have opiates to control it.

DR. SYLVESTER MCGINN: It was severe pain which required opiates, and it was respiratory.

DR. BREED: It was a respiratory pain, not an overpowering steady pain.

DR. MCGINN: Yes.

DR. BREED: I think that is a very important point.

The past history is of no importance it seems to me in this connection.

There were no murmurs and no gallop rhythm. That is of considerable importance. One would expect with a person of this age, with that amount of arteriosclerosis in her story, to hear murmurs; although in the presence of auricular fibrillation they may have disappeared. She may have had murmurs or a murmur before she began her irregularity.

There was an area of tenderness in the upper abdomen. I would like to know more about it, if I may, whether it was a tender liver or unusual tenderness in the epigastrium.

DR. MCGINN: The liver was tender in that region and later the splenic area became tender also.

DR. BREED: So that we have here a person who presumably has arteriosclerotic and hypertensive heart disease with coronary sclerosis and auricular fibrillation. It is stated that the pain in the back was pleural in character and still on physical examination the lungs were said to be clear. That is rather confusing, it seems to me. One would think that if the pain was so severe (and of pleural character) the night before admission that she had to be given opiates one would find some abnormality on examination of the chest. However, we will have to let that go as such. The urine was not abnormal except perhaps indicating some congestion. There was no anemia. There was a leucocytosis of 16,000 and there was very definite evidence of ventricular block of the left bundle branch type by electrocardiogram.

Whether this episode the night before admission was a coronary infarct, or whether it was pulmonary embolus from mural thrombi in a heart that was fibrillating I think it is very difficult to say. I think it could be either but as I read it over and as I hear that this pain in the back was pleural in character, I should rather favor the embolic explanation. Apparently she was without pain and there was no evidence of pleurisy at the time of examination. That is confusing and I do not see how we can decide about it without further data. She continued to fibrillate and the next day we do find pulmonary signs. That backs up the embolic explanation of the pain. She had some sticky râles and thereupon she was given intravenous glucose. I do not know why she was given intravenous glucose. In the record there does not seem to be any indication for the administration of it.

DR. MCGINN: She was vomiting.

### X-RAY INTERPRETATION

DR. GEORGE W. HOLMES: In this film the heart shadow is definitely increased in size, a rather general increase. She probably had some enlargement of the left ventricle, and later, dilatation of the auricles. There is well marked calcification in the arch of the aorta and a general haziness in the lower part of the right lung field, particularly in the angle between the heart and diaphragm. It states in the note that the diaphragm moved with respiration, that would make one feel that this is not an inflammatory process. If she had as much change as that in the lung from an acute inflammatory process, one would hardly expect her to move the diaphragm except perhaps with very forced respiration.

We have a lateral view which does not give much added information. You can see the outlines. Then we have films taken nearly three weeks later and they show a marked change in the appearance of the chest. The heart is increased in size and the dullness at the bases has increased. The outline of the diaphragm on the right side has disappeared, giving the picture of failing heart, with fluid accumulating in the pleural spaces.

The question of pleurisy or infarct has been raised. Emboli and infarcts of the lung are very easily overlooked by x-ray and often do not give any more of a shadow than you see here. On the other hand this patient has a small amount of fluid and the lower part of the lung is not well aerated. I do not think we have to find any pathology in that part of the

lung other than congestion with fluid in the pleural space.

### Differential Diagnosis Continued

Dr. Breed: The clinical observation of pleurisy is perfectly consistent with embolus, so that I should be willing to explain the pleurisy on an embolic basis without calling it inflammatory.

This finding of ventricular block is a very definite thing and cannot be accounted for by the effect of digitalis. It indicates coronary disease whether or not there is an infarct. I do not see how we can tell from this report itself that there has been a definite infarction of the heart, but she certainly has coronary disease. Very soon thereafter she developed more cough and raised bloody sputum, which is further evidence of emboli to the lungs. The digitalis was continued and was then supplanted by quinidine, which was not tolerated well. Following that she had pain in the left side of the chest. Was that pain pleural in character, too?

Dr. McGinn: Yes.

Dr. Breed: The temperature rose. This is perfectly consistent, as is the slight friction rub in the fourth intercostal space which was influenced tremendously by respiration; so that I see no reason to believe that this is essentially a pericardial rub. I should think it was more likely a pleuro-pericardial affair, embolic in nature. She then suddenly developed marked shortness of breath, became unresponsive and had what was apparently cerebral embolism because she had paralysis on the entire right side of the body and died.

This case as it presents itself is not an unusual picture of hypertensive and arteriosclerotic heart disease with auricular fibrillation, mural thrombi, pulmonary and cerebral emboli. She has coronary disease. Whether she had a coronary thrombosis, either fresh or ancient, I think it is impossible to tell, but from the story one does not have to make that diagnosis. I have no other differential diagnosis to offer.

Dr. Tracy B. Mallory: I should like to ask Dr. Breed where he thinks the source of the emboli was?

Dr. Breed: Presumably mural thrombi in the auricles—both auricles.

### Clinical Discussion

Dr. McGinn: One very interesting personal side of this case is that this nurse had been in active care of a single patient for thirty-five years until the death of that patient, and she succumbed shortly after. I think that is an outstanding example of devotion in medical service.

Glucose was given intravenously because of nausea and vomiting over a period of time and she was apparently symptomatically relieved by it. In addition to the quinidine and digitalis, and because of the persistent fibrillation and rapid rate, we also gave intravenous strophanthin, first one three-hundredth of a grain, then one hundred-fiftieth of a grain and the next day one hundredth of a grain. That was done some time, probably a week before the fatal outcome and before these emboli started breaking away and after she had the quinidine medication. There was nothing that affected the fibrillation, digitalis, quinidine or strophanthin. I suppose one always suspects quinidine when emboli appear, but since the rhythm was not altered there is no reason to believe the quinidine had anything to do with the emboli.

Dr. Paul D. White: I saw this case in consultation with Dr. McGinn because of the very difficult problem of controlling the heart rate. She is an example of occasional cases, fortunately only very occasional, which respond poorly to any medication. When there is such poor response one should always suspect something in the way of a complication in addition to the immediate cardiac arrhythmia. This may be pulmonary thrombosis or embolism, as in a case discussed not long ago at one of these conferences in whom pulmonary infarction of high degree prevented proper control of the ventricular rate in auricular fibrillation. In the present case we resorted to quinidine more or less as a last measure, after having failed with digitalis; quinidine once in a while will restore normal rhythm in such an emergency and save a patient from fatal heart failure. Any toxic effect from quinidine except that of nausea and vomiting can be ruled out in this case because of the failure of the rhythm in any way to be affected by quinidine and because there were no other serious signs. Quinidine kills very rarely, either by an overpowering depression of the cardiac pacemakers or by the induction of ventricular fibrillation, or, in the rarest cases of all by the pumping out of emboli from the heart at the time of the restoration of normal rhythm. Quinidine can be used much more freely and safely than many physicians believe. Having failed with quinidine we thought of trying other drugs and so used strophanthin, which we probably employ much too little in this country. But this drug also failed to give relief, and the patient died, not apparently from the immediate cardiac condition but from the complications.

Dr. Mallory: Have you any theory as to the hyperesthesia of the left arm which persisted over the six year period?

Dr. Breed: I do not see how it can be explained on the basis of pressure phenomenon.

Dr. White: Such constant hyperesthesia does not result from coronary disease. Most of the patients showing it have some nervous or rheumatic background.

DR. BREED: We have no evidence here of pressure or any mechanical cause.

DR. MCGINN: No, except that she did have some motor loss on that side immediately after the episode nine months ago in addition to hyperesthesia.

DR. BREED: Neuritis, perhaps?

### CLINICAL DIAGNOSES

Arteriosclerosis, generalized.
Hypertension.
Hypertensive heart disease.
Auricular fibrillation.
Cerebral embolus.
Right hemiplegia.
Bronchopneumonia (terminal).

### DR. WILLIAM B. BREED'S DIAGNOSES

Arteriosclerotic and hypertensive heart disease.
Bilateral auricular mural thrombi.
Pulmonary and cerebral emboli.
Auricular fibrillation.

### ANATOMIC DIAGNOSES

Hypertrophy of the heart, hypertensive type.
Mural thrombi, right and left auricles.
Multiple emboli — pulmonary, splenic, renal and cerebral.
Acute fibrinous pleuritis.
Acute fibrinous pericarditis.
Arteriosclerosis, marked, aortic and renal.
Leiomyomata uteri.

### PATHOLOGIC DISCUSSION

DR. MALLORY: We found at autopsy an enlarged heart with thrombi in both auricles. In the right auricle a relatively large thrombus had apparently just broken loose before death and was found lying free in the cavity halfway through the tricuspid valve; another beat or two of the heart and it would probably have shot into the pulmonary artery and produced instantaneous death. Previous smaller emboli had evidently broken off at earlier periods and there were infarcts at both left and right bases. The thrombi in the left auricle were distinctly smaller but evidently from them also numerous emboli had escaped, producing infarcts in the spleen, half of one kidney and in the brain. The last one in the brain obstructed the left side of the circle of Willis and I think was the immediate cause of death. We found also on the right side of the brain in the parietal lobe, behind the fissure, a large area of softening, one convolution wide which measured 5 centimeters in length. I think that represents the first of her emboli six years ago, following which she always had abnormal sensation in that arm.

I cannot substantiate Dr. Breed's prediction of coronary lesions. The coronaries were practically free from atheroma. Neither can I settle the question of the friction rubs—there was both pericarditis and pleuritis.

DR. WHITE: The question comes up here about the significance of bundle branch block in the absence of a history of angina pectoris or of coronary thrombosis. It has become customary now to regard such bundle branch block in older patients as evidence of a localized defect of the coronary circulation, which I believe to be a correct view. The blood supply to the bundle branches is carried on by very small vessels and one would have to search extremely carefully to determine the presence or absence of infarction in such very small areas. Certainly a large proportion of patients with bundle branch block do not have large infarcts at the apex or base of the left ventricle, because the blood supply to these various regions is not exactly the same. I do not think, therefore, that we can say that there was no occlusion of the small coronary vessels in this case.

DR. MALLORY: I agree that it would be virtually impossible to rule out an obliterative lesion of one of the very small arterial branches.

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## CASE 21242

### PRESENTATION OF CASE

*First Admission.* A fifty-two year old American instructor entered complaining of burning micturition.

Two years before entry he developed abdominal pain after each meal which was in part relieved by belching. The pain gradually became sharper and occasionally radiated to the left groin. It was often so severe that it would cause him to double up or even wake him at night. Approximately one year before entry he noticed that hematuria occurred after each attack. A physician found "gravel" in his urine and prescribed medicine. At about this time he developed frequency and nocturia, about four to five times. His urine was cloudy. There was no incontinence. During the past two years he had had dysuria and difficulty in starting his stream. Approximately eight months before entry a bladder tumor found by cystoscopy was removed. The pathologic diagnosis was papillary carcinoma with a low grade malignancy. The operation relieved his symptoms to a great extent and since then there were no serious attacks of abdominal pain. The urine remained free from blood and pus, but the nocturia, frequency and difficulty in starting the stream continued. He remained in bed for about two months. One month before entry a small area of the bladder was cauterized. He entered this hospital for x-ray treatment.

He had poliomyelitis at the age of four which had produced shortening of his right leg. He

had mild diabetes for the past twenty years which was easily controlled by diet.

The family and marital histories are noncontributory.

Physical examination showed a well developed and nourished man in no acute pain. The heart and lungs were negative. The abdomen was soft and showed a small suprapubic scar. The right thigh and calf muscles were atrophied. The right leg was shorter than the left. The knee jerks were absent on the right.

The temperature, pulse and respirations were normal.

The urine was slightly cloudy and had a specific gravity of 1.018, a slight trace of albumin and no sugar. The sediment was loaded with white blood cells and bacteria.

He was given a series of x-ray treatments and was discharged six days after admission.

*Second Admission,* five months later.

For the first two weeks he had slight aggravation of his symptoms, but then he gradually improved. His urinary stream became stronger. There was no dysuria although he did have some frequency and nocturia, every two hours during the day and every hour during the night. His strength improved and he gained about six pounds. His appetite was good. Two months before entry, however, he began to go downhill. He lost weight and strength. His dysuria recurred. His urine contained bright red blood evenly distributed throughout the stream without clots. During this two month period he had a constant dull pain in the left lower back which radiated to the hip and groin. During the past month he had shaking chills almost every day, especially at night.

Physical examination showed marked left costovertebral tenderness. Anteriorly the region of the left kidney was tender. The abdomen was somewhat distended. There was a small right inguinal hernia.

The temperature was 99°, the pulse 110. The respirations were 20.

Examination of the urine showed a slight trace of albumin and no sugar. The sediment contained about 50 red blood cells per high power field and numerous bacteria. The blood showed a red cell count of 3,800,000, with a hemoglobin of 60 per cent. The white cell count was 9,600, 85 per cent polymorphonuclears. The stools were negative. The nonprotein nitrogen of the blood was 20 milligrams.

X-ray examination of the pelvis and lumbar vertebrae showed no evidence of metastatic disease. A flat abdominal film showed a small rounded area of density in the course of the left ureter just below the transverse process of the fourth lumbar vertebra. The chest showed numerous metastatic nodules in the lung without evidence of metastases in the spine or ribs. An intravenous pyelogram showed that the right kidney excreted the dye normally. No dye was excreted by the left kidney, which was slightly larger than the right. The bladder appeared small and irregular, particularly on the left. An attempt at injection of the left kidney pelvis was unsatisfactory, almost all the dye returning to the bladder.

He had a urinary residual of 5½ ounces for which he was put on constant drainage. The costovertebral pain continued and he was given deep x-ray treatment over the lumbar spine and pelvis to control the pain if it were due to metastases. Three weeks after admission a prostatic punch operation was performed, removing approximately 13 grams of tissue from around the bladder outlet. One week later a cystoscopic examination showed recurrence of the tumor on the back wall of the bladder and also a pedunculated growth in the region of the opening of the left ureteral orifice, which could not be found. He ran a slightly elevated temperature, gradually failed and died approximately seven weeks after admission.

## Differential Diagnosis

Dr. George G. Smith: I suppose the x-ray treatment was intended to be directed at a recurrence of the bladder carcinoma. It does not say why he was to have x-ray treatment but that is the only assumption that I can make.

In summary of the first admission, the thing that strikes me as being of interest is the matter of this abdominal pain which he developed after each meal and which was relieved by belching. It is a little difficult to see how that can be related to the condition of carcinoma of the bladder. A duration of two years for a pain of that sort is rather unlikely, if the pain were due to any malignant condition, because malignancy usually advances pretty rapidly.

It is interesting to speculate whether the deep x-ray therapy had been the factor that caused the improvement in his bladder symptoms. I wish I felt that it would do that. But so far our experience with carcinoma of the bladder treated by x-ray has been rather unsatisfactory. I was discussing this with Dr. Holmes yesterday and he told me of several cases he had seen that had been very definitely helped, but in general I think the results that we have had here have not been particularly hopeful. The difficulty is to get a sufficient dose of x-ray in the bladder to destroy the tumor cells. Carcinomas of the bladder are very radioresistant and require five to ten erythema doses in order to kill the cancer cells, and to get such a dose into the bladder by x-ray is a rather difficult feat to accomplish.

The occurrence of chills in connection with a urinary condition is always suggestive of imperfect drainage of the kidney. A pyelonephritis is, as you know, frequently accompanied by

chills and if they continue it usually means that one or the other kidney is not being adequately drained. There is some obstruction.

The nonprotein nitrogen is distinctly below normal, which certainly shows that at least one kidney was doing adequate excretory work.

### X-ray Interpretation

Dr. Aubrey O. Hampton: Here is the first examination and this is the shadow described in the region of the left ureter. Here it is again five months later, at the same location with about the same density. After the intravenous injection the right kidney excreted dye; there is no excretion by the left. The left kidney outline was interpreted as large but rather indistinct. Then he had a retrograde pyelogram or an attempt at retrograde filling of the left kidney and the catheter would not go any higher than the margin of the sacroiliac joint. All the injected sodium iodide returned to the bladder and I do not know whether there is any in the left kidney pelvis. The shadow that we saw so well before is not seen at this time, I think perhaps due to the quality of the film. In the first film it was dense but did not quite have the density of calcium. That film was of excellent quality and would have shown wart or any soft tissue mass that happened to be present on the surface. Since I had seen the patient and knew that he had pain in the left side and since the catheter would not go up, I called this shadow a stone.

We did not at any time get a very satisfactory cystogram, but the bladder did not seem very abnormal and since the cystoscopy findings were available we did not need to examine the bladder carefully. The x-ray treatments that he received were only for the relief of pain. There was some doubt as to whether he had recurrent cancer in the bladder at the time he was treated. It had been removed by cautery. He was treated for pain and we gave him the so-called analgesic dose over the lumbar spine.

Dr. Smith: Will you show the chest films now?

Dr. Hampton: This one was taken at the second admission but we get a better idea of one of the metastatic masses in this lateral view of the spine, a large round mass lying behind the heart and at the carina of the trachea. That is the lower margin of the main bronchi, with the large mass there and numerous large irregular masses scattered over both lungs. He has a normal functioning colon in spite of the fact that it took three times the usual quantity of barium to fill it. He was able to evacuate normally so that there was no indication of megacolon.

### Differential Diagnosis Continued

Dr. Smith: We know now that there was an obstruction to the left ureter, whether it was stone or stricture or possibly some metastasis from his bladder. We know that he had metastases all through his lung and it seems reasonable to think that the chills that he had were due to the poor drainage of the left kidney. His right kidney has good function, which, as I said, accounted for the low nonprotein nitrogen. One kidney is perfectly adequate to scavenge the blood if it has a chance to work.

X-ray showed no metastases in the spine or pelvis but that does not necessarily rule them out as being a cause of pain. I do not see why it may not be reasonable to think that his pain was due to obstruction to his left ureter.

I should think it was evident, from the findings of metastases in the lungs and recurring tumor in the bladder, that one was dealing with a losing situation and was bound to be defeated. It would be interesting to know if this tumor really was grade one; that serves to bear out what I have come to believe, namely, that the grading of these bladder tumors is not of great importance in determining their malignancy. I think the ones graded one and two are not infrequently as malignant as those graded three and four. At least they kill the patient just as often.

I should think that at autopsy there would be a pyonephrosis on the left with a completely obstructed ureter. Dr. Hampton said he did not think that the shadow was dense enough to be that of a stone and consequently that makes us feel that we had better be a bit "cagey" and suggest something else, such as stricture and metastatic deposit; but he certainly had stricture in the ureter. I think he has enough to kill him in that he was full of metastases and probably had a left pyonephrosis.

### Clinical Discussion

Dr. Tracy B. Mallory: Dr. Barney, have you any comment?

Dr. J. Dellinger Barney: I was just wondering whether the tumor in the bladder and the obstruction in the ureter on the left side might have been caused by a primary tumor in the pelvis of the kidney with metastases from that to the lung and along the course of the ureter into the bladder. We do not know the location of the first bladder tumor which was excised, apparently at another hospital, but I think that is a thing that might be considered as a possibility, simply because tumors of the bladder which metastasize to the lungs are not common whereas such metastases are more common from a kidney tumor.

### Clinical Diagnoses

Carcinoma of bladder, recurrent.
Pyelonephritis.

### Dr. George G. Smith's Diagnoses

Recurrent papillary carcinoma of the bladder with pulmonary metastases.
Left pyonephrosis.

### Anatomic Diagnoses

Papillary carcinoma of the left renal pelvis with invasion of the ureter, renal vein and spermatic vein, and metastases to the bladder, lungs, liver and retroperitoneal glands.
Syringomyelia cavity of lumbar cord.
Old poliomyelitis ?
Atrophy of right leg.

### Pathologic Discussion

Dr. Mallory: The autopsy completely bears out Dr. Barney's line of reasoning. We found a large tumor of the left kidney, of the shaggy papillomatous character found in primary papillary carcinomas of the renal pelvis, an impression entirely confirmed by the histologic examination. It is characteristic of such tumors to extend downward along the ureters which may become completely filled throughout their length and implantations are by no means rare in the bladder mucosa. Radical operations which offer any hope of cure in this type of cancer require the resection of the entire ureter and of its orifice in the bladder. In my experience, however, these tumors show relatively little tendency to invade the renal parenchyma. In this case, however, the kidney was completely replaced by a huge tumor mass, and the tumor had actually, like a hypernephroma, invaded the renal vein along which it was growing like a tumor thrombus. It had even started to grow down the spermatic vein as hypernephromas so often do. Metastases were of course found in the lung and were also present in the liver and the retroperitoneal glands.

The question in this case is of course that of the relationship of the various tumor masses. Was it primary in the bladder and are all the others secondary deposits? I agree with Dr. Barney that this seems improbable. Were there two primary tumors, one in the bladder and another in the pelvis of the kidney? I cannot rule out the possibility though I see no need of such an assumption. Was it primary in the kidney pelvis? Everything which we found is perfectly consistent with such a hypothesis though it is remarkable that the primary growth was so long silent.

The autopsy served further to cast doubt upon the diagnosis of old poliomyelitis which had been made to account for his atrophic leg. Dr. Kubik found a syringomyelic cavity in the lower lumbar cord which could certainly have explained the neurologic abnormalities. There was, however, some apparent diminution in the number of anterior horn cells, so that he did not feel that he could rule out poliomyelitis entirely.

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## THE ANNUAL MEETING OF THE MASSACHUSETTS MEDICAL SOCIETY

THE One Hundred and Fifty-Fourth Annual Meeting of the Massachusetts Medical Society has passed into history. It stands as one of the most successful and important official functions of this organization because of a registration of 1,321 Fellows, many invited guests, a scientific exhibit which portrayed the important accomplishments of medicine in this Commonwealth, and problems before the profession which are awaiting solution.

The papers and discussions submitted to the several sections represented the best possible treatment of the subjects scheduled, and constituted comprehensive postgraduate education on a broad scale.

In the Shattuck Lecture, Professor Gallie discussed the problems involved in dealing with sprains and dislocations and described the methods employed in treating these disabilities. This address was most instructive, and held the attention of the audience throughout. It will be published in the *Journal* as early as possible.

At the Council Meeting the following officers were elected for the ensuing year: Charles E. Mongan, President; Channing Frothingham, Vice-President; Alexander S. Begg, Secretary; Charles S. Butler, Treasurer; and Reginald Fitz, Orator. Further reference to these officers appears below.

The attendance was unusually large, and close attention was given to every item on the agenda. With no prolonged discussion, the reports of the committees were approved.

The invitation from the Hampden District to hold the next annual meeting in Springfield was promptly accepted, undoubtedly because of the recollection of the success of a previous meeting held in that city and the reputation of its doctors and institutions which gives assurance of an enjoyable and profitable occasion.

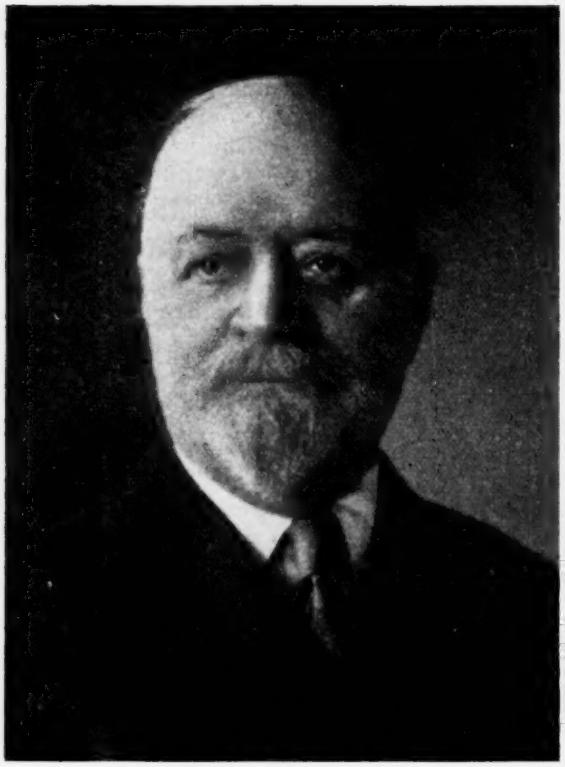
The Annual Meeting of the Society also attracted a large attendance to hear the address of the retiring President, the Oration of our recently deceased Fellow, Dr. Brace W. Paddock of Pittsfield which was well delivered by his son who is now a student in the Harvard Medical School, and to consider an important matter which had been dealt with by the Committee on Ethics and Discipline and a Board of Trial. This has been the subject of controversy and will be considered by a large committee according to a resolution adopted. Final action was postponed to a subsequent meeting of the Society after the conclusions of the committee will have been received.

The Proceedings of the Council and the Society will be published as soon as they are presented to the *Journal* by the Secretary. They warrant careful study by every Fellow in order that the history of the Society may be kept clearly in mind.

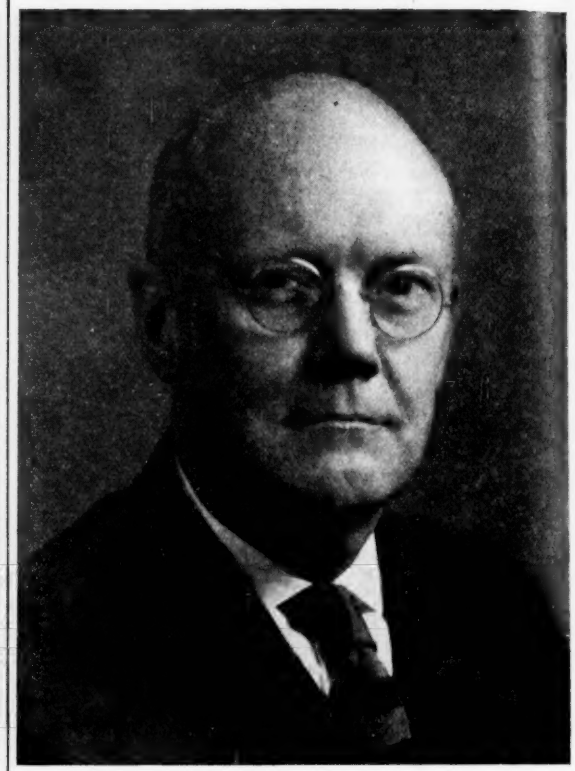
### THE OFFICERS

THE PRESIDENT—Dr. Charles Edward Mongan brings to the office the results of a long and concentrated study of medicine and its adaptation to human affairs.

He was born in Somerville, Massachusetts, of ancestors who came to that city more than one hundred years ago. He was educated in the public schools of his native city, later graduating from Boston College with the degrees of A.B. and A.M. For three years he taught school in Palmer, Massachusetts. He then entered the Harvard Medical School, and received his M.D. degree in 1892. Following this training he engaged in postgraduate study in obstetrics and gynecology, first in the Rotunda Hospital, in Dublin, Ireland, and afterward in Guy's Hospital, London, under Hale-White, with service in the Main Hospital and Out-Patient Depart-

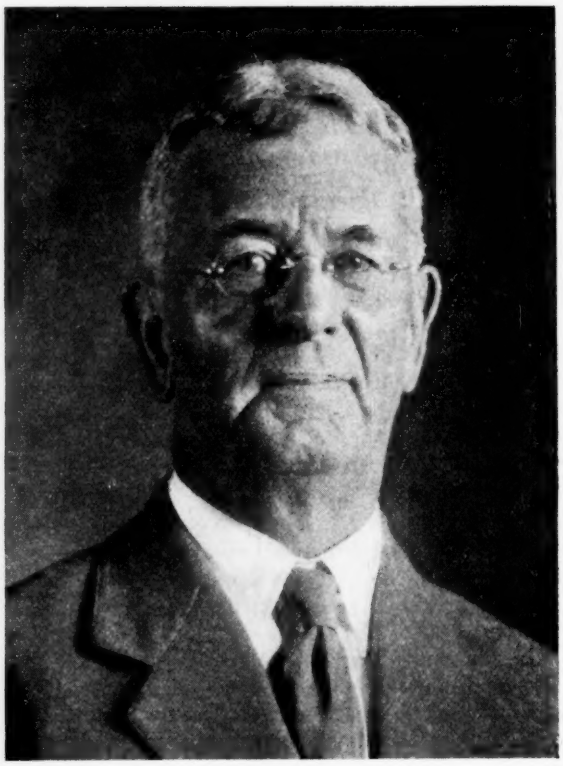


CHARLES E. MONGAN,
President.



CHANNING FROTHINGHAM,
Vice-President.

ALEXANDER S. BEGG,
Secretary.



CHARLES S. BUTLER,
Treasurer.

ment under W. Arbuthnot-Lane. Other studies included courses under David Ferrier at the London Hospital for Nervous and Epileptic Patients.

On his return to America he engaged in practice in Somerville and was soon appointed to the staff of the Somerville Hospital and the Holy Ghost Hospital for Incurables at Cambridge.

Dr. Mongan is a Fellow of the American Medical Association and has represented the Massachusetts Medical Society in the House of Delegates since 1921. His election to the Council of the State Society has been without interruption since 1910. During this period he has served on important committees and is credited with the revival of the very active Section of Obstetrics and Gynecology after a dormant period of fifteen years. Other committees which owe much to his influence are that on Radiology and Physiotherapy and that on Public Relations. For the past twenty years he has devoted much time to the study of medical economics and mortality statistics and has served on important committees of the House of Delegates of the A. M. A. He is married and lives with his family at 24 Central Street, Somerville.

THE VICE-PRESIDENT—Dr. Channing Frothingham is Physician-in-Chief of the Faulkner Hospital, Jamaica Plain. He was born in Boston in 1881. His premedical education was acquired in Harvard College, and his A.B. degree was conferred in 1902. He graduated from the Harvard Medical School in 1906. Dr. Frothingham was Medical House Officer, Boston City Hospital, 1906-07; Assistant Visiting Physician, Carney Hospital, Out-Patient Department, Boston, 1908-12; Secretary, Faculty of Medicine, Harvard, 1908-13; Assistant in Theory and Practice of Physic, Harvard Medical School, 1908-12; and Instructor in Medicine 1913-22; Assistant Professor of Medicine, Harvard, 1922-28; Associate Clinical Professor of Medicine, Harvard, 1928-33; and Chairman, Department of Medicine, 1928-33. He was commissioned Lieut. Col., M. C., U. S. Army, serving from June 1, 1917 to December 5, 1918 at Camp Devens. He served as Physician, Peter Bent Brigham Hospital, 1912-32, and since then Physician-in-Chief, Faulkner Hospital and Consulting Physician, Peter Bent Brigham Hospital.

THE SECRETARY—Dr. Alexander S. Begg, Dean and Waterhouse Professor of Anatomy of the Boston University School of Medicine was born in 1881 at Council Bluffs, Iowa. His premedical education was acquired at Drake University, Des Moines.

He graduated in medicine from Drake University, College of Medicine, in 1907, and soon after was appointed instructor in pathology and assistant professor in histology and embryology, later being advanced to full professorship in this department.

In 1913 he came to Boston to fill the position of instructor in comparative anatomy at the Harvard Medical School, and in 1916 was elected to the position of Dean of the Harvard Graduate School of Medicine. He resigned this position to take over his duties at Boston University as defined above.

During the World War he served in France as Commander of Base Hospital 88, until he returned to Boston in 1919. He was appointed Acting Secretary by President Robey to fill the vacancy caused by the death of Dr. Burrage which occurred January 26, 1935.

THE TREASURER—Dr. Charles Shorey Butler was born in Boston in 1870 and after an early education in the private schools of this city he entered Harvard College and graduated in 1893. He took his M.D. degree from the Harvard Medical School in 1898 subsequently serving an internship in the Massachusetts General Hospital, and later was appointed on the staff as Accident Room Surgeon. For seven years he was engaged in teaching as assistant in anatomy at the Harvard Medical School.

During the World War he served as surgeon in the French Army in the years 1915, 1916, and 1917. In 1917 he returned to Boston retiring from practice in that year, and devoted his time to his personal affairs.

Having interest in financial matters he was regarded as especially qualified to fill the position of Treasurer of the Society, and was elected in June, 1931 when his predecessor, Dr. A. K. Stone, resigned. His administration of this office has been outstanding and he has been his own logical successor each year since his first election.

THE ORATOR—Dr. Reginald Fitz of Boston was elected Orator to deliver the Annual Discourse in Springfield in 1936.

Dr. Fitz is Chairman of the Committee on Medical Education and Diplomas, and Chairman of the Executive Committee of the Committee on Postgraduate Instruction of the Massachusetts Medical Society.

He is a member of the Council on Medical Education and Hospitals of the American Medical Association. His local professional activities include service on the Staff of the Peter Bent Brigham Hospital, and Assistant Professor of Medicine of the Faculty of the Harvard Medical School.

## SOCIAL FEATURES

The social features of the meeting were carefully planned by the President, the Committee of Arrangements, the Secretary, the Treasurer,

and a Committee of Ladies, so that the most important event, that of the Annual Dinner, was an enjoyable affair. The accommodations were well planned and the menus and service most satisfactory.

President Robey sustained his reputation as an exemplar of the art of toastmaster, and showed rare judgment in his selection of after-dinner speakers. Although His Excellency, the Governor, was unable to attend, he sent his cordial well wishes through an associate in State Service.

His Honor, Mayor Mansfield, gave an instructive exposition of the intricacies incident to balancing the municipal budget and explained the relation of the tax limit and the tax rate. He expected that the tax rate of Boston could be reduced slightly and indicated his intention of working to that end. He is especially ambitious to improve the financial condition of the city and is confident that business is improving. He is also interested in bettering the health conditions of Boston and complimented the doctors for their efforts in this field. He assured the Society that he had an understanding of some of its problems, for he is a registered pharmacist and previous to his study of law was thereby brought into definite relations with the medical profession. He explained the embarrassment imposed by the control of Boston's affairs by the State under present laws. His address was interesting from many angles, and his suggestion that there should be many statues of distinguished Boston doctors in our public parks was appropriate because other municipalities have shown interest in keeping the names of these benefactors before the people.

Mr. Roscoe Pound, Dean of the Harvard Law School, after witty references to his early experiences on an "insane commission" in another state, delivered an exposition of his interpretation of the changing conditions in the civic life of this country as shown in his contrast of the pioneer age when individuals and communities were competent to meet practically all of the needs of families and small towns with the development of specialists in personal service and great business organizations which have driven small producers out of industry.

Equally significant are the changes which have taken place in the professions, for early in our history the local lawyer, clergyman or doctor was supreme in his field, but now there is less individual influence, for it has given way to combinations of men and methods. Certain forms of organizations are giving way to others, as shown by the power of political over religious bodies, and the question is before us as to whether the time is coming when the professions will be controlled by legislation and the people must decide whether voluntary association may refuse to surrender to a "political mess of pottage".

It is quite impossible to report adequately the reasoning and shades of expression in this remarkable address which was a reflection of profound thinking as applied to the ethical and civic problems of society.

Dr. Douglass V. Brown, Assistant Professor of Economics of Harvard University, gave an interesting résumé of his study of the economic conditions affecting the practice of medicine, including patients as well as doctors, during a recent tour of the country. He found that in most sections many doctors were not receiving satisfactory incomes and many people were not getting adequate medical care. The underlying conditions are so complex that much time and study will be required to enable one to make a sound analysis of the relative importance of the contributory causes, and until further knowledge is acquired it would be futile to prescribe remedies. He urged physicians to keep themselves informed of the experiments under way throughout the country which are designed to solve adverse conditions, because plans must be made which are adaptable to local needs. No one scheme will have general application. The attitude of the laity must be taken into consideration, for there is confusion in the minds of many people as to where to seek the required service. For example, group payment for hospital care appears to be popular in some places but is not regarded favorably in others. Several different voluntary and legislative plans were referred to, but, while he hoped to submit specific recommendations as to those worthy of trial, the attitude at the present time may properly be that human ingenuity will eventually solve the most pressing needs.

The Rev. Dr. Osgood based his address on the records of a doctor of the Revolutionary Era found in an old book among the relics hidden away in an attic of a house occupied by his wife's ancestors. The pages of hand-made paper recorded a long life of service in the seventeenth century. In contrasting the therapy of that period with that of the present, he found many opportunities for the display of his wit which was a happy diversion for doctors who are constantly dealing with the most serious affairs of life. His great interest in human welfare and the adaptation of his talents to solving the complexities of modern life inspired him to bursts of eloquence and expressions of sympathy for those who require guidance in meeting the depressing influences of disease and the problems of the present age.

At the conclusion of Dr. Osgood's address, President Robey introduced Dr. Charles E. Mongan, the President-Elect, who expressed his appreciation of the honor conferred upon him by the Society. He gave a brief history of his

many years of service on committees, and his participation in the deliberations of the Council, and assured the Fellows that he would concentrate attention on the many questions now before the profession and the people.

He appeared to be confident that a united and virile Society could meet the expectation of organized medicine in solving the problems now before the nation relating to the economics and adequacy of medical care. To this end he sought the united support of every member of the Society. The response of the meeting was evidence of its coöperative spirit.

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Any report of the Annual Meeting would be incomplete without an acknowledgment of the excellent organization and work of the Committee of Ladies under the chairmanship of Mrs. William H. Robey. To this Committee was given the function of entertaining the wives and other members of the families of the Fellows. In response to invitations issued by this Committee, three hundred and eighty ladies registered and were entertained at teas, a buffet supper, a trip to Concord with a luncheon, a visit to the Gardner Museum, social service functions at the Massachusetts General Hospital, and other places of interest. These visiting ladies were also invited to attend the Shattuck Lecture, moving pictures, and to hear the postprandial speakers. The cordiality exhibited by this Committee was appreciated and has established a custom which will be a regular feature of future meetings.

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The Committee of Arrangements has placed the Society under great obligation for the energy and judgment displayed in its attention to all details and has established a standard of executive excellence which will be a model for the future. The Chairman, Dr. W. M. Shedden, retires with a reputation of devotion to an arduous task and his associates on the Committee have shown a spirit of coöperation which must have been a great comfort to him. His successor, Dr. W. R. Morrison, is planning to emulate the example set by his chief. He will have the assistance of men of ability and experience in this field.

The Scientific and Commercial Exhibits were well staged and those in charge were pleased with the accommodations prepared for them.

We look forward to the Springfield Meeting with pleasant anticipation.

Sixty-one men played Golf at the Belmont Springs Country Club Wednesday, June 5, in the Tournament sponsored by the Massachusetts Medical Society. The day was cloudy and the skies threatening, which undoubtedly kept a number of members from attending.

In Class A the best low gross score was won by Dr. Henry Godfrey of Newton. Dr. Joseph Carey won low net in this division. In Class B Dr. A. J. A. Campbell got the low gross score and Dr. Allan Davis came in first on low net in this class. In the Kickers Tournament the prizes were won by Dr. Samuel L. Poplack of Taunton, Dr. Walter Burrage, Dr. William Noonan, Dr. David Green, Dr. Paul Gustafson, Dr. Gerald Doherty, Dr. Sidney Wiggin and Dr. Charles Wilinsky. The Guest prize was won by one of the three guests present, Dr. Mackey, a dentist.

The prizes* were elaborate and well worth the players' efforts. They were generously contributed by the following: Brewster Ambulance Service, Charles W. Broadbent Co., Codman and Shurtleff, Inc., Coward Shoe Co., Inc., Crosbie-Macdonald, Crowley & Gardner, Kenmore Pharmacy, Inc., E. F. Mahady Co., Peter F. Rogerson, Philip Morris, Physician-Dentist Service, Inc., Surgeons & Physicians Supply Co. and Thomas W. Reed Co.

*We are informed that the prizes were won by amateurs and not by the more professional golfers. The handicaps were arranged so as to give the less skillful a fair opportunity to secure a prize.

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## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

BENEDICT, FRANCIS G. A.B., A.M., Ph.D., Sc.D., Honorary M.D. University of Würzburg, 1932. Director of the Nutrition Laboratory of the Carnegie Institution of Washington, Boston, Mass., since 1907. His subject is "Old Age and Basal Metabolism." Page 1111. Address: 29 Vila Street, Boston, Massachusetts.

BLOOMBERG, MAXWELL H. M.D. Tufts College Medical School 1924. Orthopedic Surgeon to Out Patient Department, Carney Hospital and Beth Israel Hospital. Orthopedic Surgeon to Greater Boston Biekur Cholim Hospital, Roxbury, Mass. His subject is "Report of a Case of Primary Pneumococcus Arthritis." Page 1122. Address: 21 Bay State Road, Boston, Massachusetts.

ROBERTS, STEWART R. A.B., B.S., S.M., M.D. Emory University 1900. Professor in Clinical Medicine, Emory University. Physician to Emory University Hospital. Ex-President, Southern Medical Association. His subject is "The Social Trends Underlying Health and Hospital Insurance." Page 1123. Address: 768 Juniper Street, N. E., Atlanta, Georgia.

SHELDON, RUSSELL F. A.B., M.D. Harvard University Medical School 1911. Assistant Anes-

thetist, Massachusetts General Hospital and Massachusetts Eye and Ear Infirmary. His subject is "Progress in Anesthesia in 1934." Page 1129. Address: 31 Pinckney Street, Boston, Massachusetts.

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY*

C. J. Kickham, M.D., *Chairman*, 524 Commonwealth Ave., Boston, Mass.
R. S. Titus, M.D., *Secretary*, 472 Commonwealth Ave., Boston, Mass.

### The Treatment of Patients in Eclamptic Convulsions

This serious complication of pregnancy concerns both the mother and the baby, and its intelligent management is essential. Fortunately, because of wider use of prenatal care through educational measures, it is becoming more uncommon.

There are still adherents to the surgical and radical treatment, in spite of the definitely lowered maternal and infant morbidity and mortality since the more general use of the medical or conservative treatment. Any disease of unknown etiology will surely have a varied treatment. On the whole, in accord with the practices of the majority of obstetricians, and disregarding radical measures here, the writer has used the conservative method with success.

The treatment recommended may be varied by the individual accoucheur, but the general plan is based on Stroganoff's (1909) and Fischer's (1916) methods. Naturally, one must differentiate eclampsia and hysteria, epilepsy, medicinal poisonings, uremia, meningitis or any disease presenting convulsions.

Eclampsia may occur:

1. Before the onset of labor.
2. During labor.
3. After delivery.

The treatment is similar at any time.

1. *Before the onset of labor:*
   (a) Hospitalization in a dark, quiet room, with constant supervision.
   (b) Immediate control of convulsions. This can be accomplished by morphine sulphate grain ¼-½ subcutaneously at once. One-fourth grain may be repeated in four hours or sooner until the respirations are down to fourteen per minute. Sodium amytal, phenobarbital, pentobarbital, pernocton, chloral hydrate by rectum, luminal sodium and other sedatives are used instead of morphia.
   (c) Prevention of self-injury by gentle restraint and a padded mouth gag during a convulsion. Removal of false teeth.
   (d) $O_2$ inhalation following a convulsion.
   (e) For the reduction of the blood pressure and the edema of the brain and other tissues, and to promote diuresis, intravenous magnesium sulphate (20 cc. of a 10 per cent solution) is recommended. This may be repeated every hour, being guided by the blood pressure readings and the control of the convulsions. No more than six to eight injections in twenty-four hours are advisable. If there is any sign of toxic effect from the magnesium sulphate, evidenced by depression of the respiratory center, the effect may be combated by the intravenous injection of 5 cc. to 10 cc. of a 10 per cent solution of calcium chloride.
   (f) Constant drainage by a self-retaining catheter with twenty-four hour intake and output record.
   (g) If patient is vomiting, a Levin's tube is used through which a gastric lavage is done and 2 oz. of concentrated magnesium sulphate solution is introduced into stomach for catharsis. Liquid food may be introduced.
   (h) To promote diuresis in addition to other agents, and to spare the liver and reduce acidosis and decrease cerebral and general edema, 100 cc. of a 50 per cent solution of glucose is used, which may be repeated three or four times a day. Occasionally, 500 cc. of a 5 per cent solution is used instead.
   (i) Venesection is only rarely used.
   (j) Institution of measures for the termination of the pregnancy, when the convulsions have been controlled. One should try to carry the patient to term, if the eclampsia occurs before the period of viability especially since labor is often initiated by eclampsia without interference. One should be guided by the condition of the cervix, the existence of disproportion between the passage and the passenger, the patient's condition and past history (para). The use of a Vorhees bag and rupture of membranes is recommended for induction of labor, but, not pituitrin, if delivery can occur per vaginam. Occasionally, cesarean section becomes necessary, because of disproportion, abnormal presentation, placenta previa, sep-

*A series of short selected articles by members of the Section will be published weekly.

Comments and questions by subscribers are solicited and will be discussed by members of the Section.

aration of the placenta, and heart disease, but it has been firmly established that routine cesarean section gives the highest maternal mortality. The low cervical cesarean is better and should be done under novocain, with the aid of $N_2O$ and $O_2$. Vaginal hysterotomy has been done, but, the former is preferred.

2. *During Labor:*

In addition to the above measures to control the convulsions, etc., one should allow the patient to deliver normally if progress is rapid, using $N_2O$ and $O_2$ during pains, or very conservative measures to terminate labor are employed because the patient is safer if delivered. Episiotomy or prophylactic forceps under local, spinal, or caudal anesthesia are recommended. $N_2O$ and $O_2$ is used too. Other less conservative measures as version, mid and high forceps may be necessary, but these decisions must rest with the individual obstetrician.

Accouchement forcé cannot be condemned too strongly.

3. *After Delivery:*

Eclampsia is rather uncommon at this stage, but the above measures may be instituted or continued, especially since there may be more or less permanent renal damage. Venesection may be used depending on the extent of bleeding at the time of delivery. Close observation is necessary even for weeks later, the patient being kept on a strict nephritic régime with the urine and blood pressure as indices of improvement.

Other Methods of Treatment:

1. To Stroganoff, we owe the present conservative methods which are more or less modifications of his original method. In brief, they are based on the relief of convulsions by sedatives with induction of labor as a final measure if the former is unsuccessful.

The Rotunda Hospital treatment is essentially one of sedation and starvation and colonic lavage.

Veratrum viride is still used occasionally by some. Generally, it has been discarded.

Spinal anesthesia, fluid limitation and dehydration, removal of blood plasma and the reinfusion of corpuscles, and intramuscular injections of liver extract cannot be relied upon as single agents in the treatment of eclampsia.

## MASSACHUSETTS LEGISLATIVE NOTES

**House 717.** Petition of Edward Carr that reports of physicians of insurance companies and of hospitals in connection with employees injured in industrial accidents be open to inspection.

June 7. Enacted in House.

**House 1894.** Resolve providing for an investigation and study by a special commission relative to the establishment and administration of a system of health insurance.

June 11. Joint Rules.

**House 1157.** Petition of Henry J. Kennedy for establishment of a board of examination and registration to regulate the practice of chiropractic.

Is in the House Committee on Ways and Means.

## MISCELLANY

### PROFESSOR CHARLES S. BURWELL'S APPOINTMENT

Dr. Charles Sidney Burwell, Dean-Elect and Research Professor of Clinical Medicine in the Harvard Medical School, formerly Professor of Medicine at Vanderbilt University, has been appointed to the staff of the Peter Bent Brigham Hospital, Boston, as Physician, where he will continue clinical investigations of heart disease.

### WORCESTER HAS A TYPHOID PROBLEM

There have been reported seven definite diagnosed cases of typhoid fever in Worcester.

There have been two deaths originally ascribed to causes other than typhoid fever but which now have aroused the suspicion of having been caused by this disease.

Examination of milk and food supplies has not indicated the source of the disease, and the attention of the health authorities has been turned toward the possible presence of a carrier in the city. With water, milk and food supplies beyond suspicion, the probable explanation is that there is some apparently well person disseminating the specific germs.

### NEGLECT OF PROPER TREATMENT OF CANCER

Dr. Carl Eggers, Director of Surgery in the Skin and Cancer Division of the New York Post-Graduate Hospital, reports that the proper treatment of cancer is being neglected because of delayed diagnosis by general practitioners and urges reference to experts in all doubtful cases. He set forth in a recent address at the Bellevue-Yorkville Health Centre that many cases of cancer of the stomach and intestine are curable if diagnosed and adequately treated in the early stages. He claims that many operations are performed by men who are not sufficiently well trained to engage in this type of surgery.

### CEREBROSPINAL MENINGITIS IN NEW YORK

The Department of Health of New York City reports the prevalence of epidemic cerebrospinal meningitis above the usual number of cases.

### TULANE UNIVERSITY OF LOUISIANA CELEBRATES ITS HUNDREDTH YEAR

During a four-day fête, June 8-12, in connection with its commencement exercises, and in commemoration of its achievement of a full century of medical and other higher education, Tulane University of Louisiana celebrated its hundredth year with an elaborate program—which included the awarding of honorary degrees to thirteen outstanding Americans.

Not only was credit given to the Tulane School of Medicine for its notable contributions to medical research and clinical application and practice, but also for its large contribution to the health and well-being of the people of the South, Southwest, and Central America, through the 6,500 and more doctors which Tulane has graduated during the century of its existence.

Located adjoining the great, state-operated Charity Hospital, in the port city of New Orleans; equipped with the most modern and expertly-planned medical plant in the South; with a faculty of more than 150 recognized medical experts; and with unexcelled facilities for practical, clinical teaching, the Tulane School of Medicine, and the Graduate School of Medicine presented a vivid contrast with the beginning one hundred years ago.

## CORRESPONDENCE

### A CRITICISM OF THE *NEW ENGLAND JOURNAL OF MEDICINE*

June 3, 1935.

Editor, *New England Journal of Medicine*,

The *New England Journal of Medicine* was a leader in dispersing scientific facts for over a century. I think it is a shame to use this paper as a propaganda organ for half cooked world improvers. Certainly the paper on "Recent Changes in German Health Insurance under the Hitler Government" is neither medical nor scientific, but contains plenty of propaganda and is therefore unworthy to appear in our periodical. It is remarkable by omission of facts rather than by its statements. The statement, "it is highly significant that the medical profession has been given a more definite and distinctive participation in the conduct of sickness insurance than it has possessed in Germany up to this time," is false. One medical member on a big committee could not do much good even if he would be the chosen representative of the profession; as it is, he is appointed by political powers and represents them rather than the medical profession. The paper neglects to mention the fact that more than three thousand physicians were deprived of the only means available to them to make a living through the Health Insurance Panel Practice Act alone. The first sentence of the last paragraph "A system of furnishing medical care which has lasted through two political revolutions and the great economic changes of the last fifty years, which has been steadily extended during this period, would seem to possess elements of inherent stability. It would seem to have answered a definite need of the people and given a substantial degree of satisfaction" is a dangerous misrepresentation. The people had never anything to do in starting or modifying the insurance system. They were never asked if they were satisfied or dissatisfied. In my opinion the only thing proved by the survival of the German Health Insurance is, that State-Medicine once started, good or bad, will survive even revolutions. The fact so skillfully omitted by Dr. Davis and Miss Kroeger that more than three thousand medical men were deprived of their means of supporting themselves should open the eyes of the American medical profession to one great danger of State Medicine. I hope, Mr. Editor, that my comments will be published soon. I am only sorry that so much space has to be taken from the valuable scientific part of the *Journal* to refute a propaganda paper which never should have been published in the *Journal*.

Very truly yours,

JOSEPH MULLER, M.D.

28 Pleasant Street,
Worcester, Mass.

## RECENT DEATHS

**FOSGATE**—ELMER GILMAN FOSGATE, M.D., of Ashburnham, Mass., died Saturday, June 8, 1935, of heart disease after an illness of eight months. He was born in Winchester, N. H., on July 20, 1859, and was graduated from the Winchester high school. After a year's study in the New Hampshire State College he entered the medical school of Dartmouth College from which he received his degree of M.D. in 1888. He practiced in Rindge, N. H., from 1889 to 1895 when he removed to Ashburnham where he remained in the continuous practice of his profession until his death. He joined the Massachusetts Medical Society in 1895.

Dr. Fosgate was the recipient of many honors from his fellow townsmen, having been chosen selectman, member of the board of health and school physician, holding the latter office at the time of his death. He was elected to the Massachusetts Legislature in 1912 and 1913. He was a member of the Massachusetts Medical Society, Worcester County selectmen's association and Ashburnham grange. Though previously affiliated with the Congregational Church he later joined the Federated Church in Ashburnham and was chosen a deacon for many years. He leaves a widow and one daughter, Hazel, who is a teacher in the public schools of Springfield, Mass.

Dr. Fosgate was a constant attendant at the meetings of the Worcester North District Medical Society and was highly regarded by his confreres and residents of Ashburnham for his ability and his cour-

teous manner. The funeral was held Tuesday, June 11, from the Congregational Church in Ashburnham.

FRANCIS M. MCMURRAY, M.D., *Secretary.*

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**SHAW**—JOHN PORT SHAW, M.D., of 11 Fuller Street with an office at 6 Main Street, Brockton, Massachusetts, died, June 5, at his home after a long period of declining health. He was born in Manvers, Durham County, Ontario, in 1858, the son of George and Elizabeth (Lee) Shaw.

After attending public schools in his native town, he took premedical courses at Toronto University and graduated in medicine from Trinity Medical School an affiliate of Toronto University. He took postgraduate courses at St. Mary's Medical School and Hospital in London, receiving therefrom the M.R.C.S. degree. He then came to Brockton and, in addition to conducting a large practice, became interested in civic affairs, and was especially active in the All Saints' Episcopal Church in Whitman which grew from a small mission to an important representation of the Episcopal denomination.

He was prominent in Masonic, Odd Fellows and Knights of Pythias Orders and was a former president of the Plymouth District Medical Society. He had held the same position in the Brockton Medical Society. Dr. Shaw was a Fellow of the Massachusetts Medical Society and the American Medical Association, and a member of the Staff of the Brockton Hospital for twenty years, retiring in 1924.

He is survived by his widow, Mrs. Adelaide (Powers) Shaw, and a sister, Mrs. Margaret Rusk, of Saskatchewan, Canada.

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**MYERS** — SOLOMON MYERS, M.D., formerly of the West End, Boston, and of late years of East Boston, died January 18, 1935. He was born in 1872 and graduated from the Harvard Medical School in 1900.

He gave much time and energy to the work of the Mt. Sinai Hospital which was the predecessor of the Beth Israel Hospital and was also on the Staff of the Chelsea Memorial Hospital. He had practiced in East Boston for the last thirty-two years.

He was a Fellow of the Massachusetts Medical Society, the American Medical Association, and a member of the East Boston Medical Society.

Besides his widow, Mrs. Nettie Myers, he is survived by two daughters, Minerva Myers and Zelma R. Myers, and a son, Sumner B. Myers, A.B. (Harvard), at present a National Research Fellow in Mathematics at Princeton.

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**PURINTON** — HERBERT HARMON PURINTON, M.D., of Somersworth, New Hampshire, died June 7, 1934. He was born in Saco, Maine, in 1865. He was a graduate of Livingston Academy, Livingston, Maine, and took his medical degree from Bowdoin Medical College in 1891. He was a member of the Massachusetts Medical Society and a Fellow of the American Medical Association. He held registration in Maine, New Hampshire, Massachusetts, Connecticut, North Carolina, Virginia, West Virginia, Haiti and the West Indies. He was a member of the Masons, Odd Fellows, and Red Men.

His widow, Mrs. Marie Allen Purinton, a half-brother, Dana Purinton, and a half-sister, Ethel Purinton Case, survive him.

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**BROWN** — HENRY WILSON BROWN, M.D., of 61 Broadway, Haverhill, Massachusetts, died at his home, June 7, 1935. He was born in 1855 at Grafton, Massachusetts, the son of Sewall Brown and Hannah (Winn) Brown.

He was an oculist and had practiced at 8 Welcome Street in the Ayers Village Section. He graduated from the Albany Medical College in 1889.

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**FREEMAN** — FRANKLIN WILLARD FREEMAN, M.D., of Lynnfield Center, Massachusetts, died December 5, 1934. He was born in Needham, Massachusetts, October 23, 1860.

He graduated from the University of Vermont Medical College in 1889 and took postgraduate courses at the Harvard Medical School. He first practiced in Newton Lower Falls for ten years, then moved to Lynnfield Center where he lived and practiced to the time of his death.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association.

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**HOLZMAN** — JOSEPH HOLZMAN, M.D., of Elm Hill Avenue, Roxbury, Massachusetts, died June 3, 1935. He was born in Russia in 1870, graduated from the University of Illinois College of Medicine in 1892 and soon after settled in Boston, first practicing in the West End and later moving to Roxbury. He was a Fellow of the Massachusetts Medical Society.

His widow, two daughters, a son, two brothers and a sister survive him.

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**GABOURY** — GEORGE NAPOLEON GABOURY, M.D., of 36 Forest Park, Springfield, Massachusetts, with an office at 175 State Street, died at his home, June 4, 1935.

He was born in 1884 and graduated from the Harvard Medical School in 1910. He was especially interested in the diseases of children and in addition to his practice devoted much time to the study of mathematics and physics.

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**ELLAM**—HERBERT W. ELLAM, M.D., Vice President of the Worcester North District Medical Society, died suddenly at his new home at 85 Nowell Road, Melrose Highlands, June 4, 1935. He had moved to Melrose just two weeks previously, having retired from practice in Gardner, Mass.

He was born in Clinton, September 3, 1879, the son of John W. and Annie (O'Brien) Ellam. In 1886 his family moved to Southbridge where he attended the public schools, being valedictorian of his high school graduating class. He graduated from the Harvard Medical School in 1904; after a thorough hospital training at the Boston Floating Hospital and the Worcester City Hospital, he came to

Gardner in 1906. He later took Postgraduate courses at the Mayo Clinic and the Harvard Medical School. He was a senior surgeon on the staff of The Henry Heywood Hospital until his retirement last December, when he was appointed to the Consulting Staff.

Dr. Ellam served in the Army Medical Corps for sixteen months and was a Major in the Reserve Corps at the time of his death. He was appointed Associate Medical Examiner in 1920 and Examiner in 1930, of the 2d Worcester District. He joined the Massachusetts Medical Society in 1906, was also a Fellow of the American Medical Association and the American College of Surgeons. Fraternally, he was associated with Hope Lodge A. F. & A. M., Gardner Chapter R. A. M., Ivanhoe Commandery K. T., Aleppo Temple, the Harvard Club of Boston, the Gardner Boat Club and the American Legion. He is survived by his sister, Mrs. Minnie Redemann, of Melrose.

FRANCIS M. MCMURRAY, M.D., *Secretary.*

## NOTICES

### BOSTON CITY HOSPITAL

The Ophthalmic Service of the Boston City Hospital invites physicians to attend the Henry Willard Williams Memorial Lecture Monday, June 24, 1935, at 8:15 P.M., in the Cheever Amphitheatre, by Walter Brackett Lancaster, M.D., President, American Ophthalmological Society. (Formerly Visiting Ophthalmic Surgeon at Boston City Hospital.)

Subject: Ophthalmology Then and Now.

JAMES J. REGAN, M.D.,
*Ophthalmic Surgeon-in-Chief.*

### ANNOUNCEMENT

JOSEPH TARTAKOFF, M.D., announces the opening of an office at 79 Warren Street, Roxbury.

### REMOVAL

CHARLES SPIVA, M.D., announces the removal of his office from 1786 Acushnet Avenue, New Bedford, to 189 Bates Street, New Bedford.

### LAWRENCE CANCER CLINIC

Established 1928

Lawrence, Mass.,
June 4, 1935.

*To the Physicians of the North Half of Essex County:*

*Dear Doctor:*

The regular Lawrence Cancer Clinic, to be held at Lawrence General Hospital, 1 Garden Street, Lawrence, upon Tuesday, June 18, at 10:00 A.M., will be a Demonstration Clinic with Channing C. Simmons, M.D., of Boston, Surgeon-in-Chief to the Collis P. Huntington Memorial Hospital, and member of the Cancer Commission of Harvard University, Boston, present as consultant. You are invited to accompany any of your patients whom you desire shall have this service, or to send them with a note, and a report will be returned to you. This service is gratis. Your attendance at the Clinic is always welcome.

This Clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society.

Committee

ROY V. BAKETEL, M.D.,
CHAS. J. BURGESS, M.D.,
FRED'K D. MCALLISTER, M.D.,
JOHN J. MCARDLE, M.D.,
HARRY H. NEVERS, M.D.,
THOS. V. UNIAC, M.D.,
J. FORREST BURNHAM, M.D., *Chairman.*

## REPORTS AND NOTICE OF MEETINGS

### PLYMOUTH DISTRICT MEDICAL SOCIETY

A stated meeting of the Plymouth District Medical Society was held at the Pat-Pan-Eto Ranch, Stoughton, Thursday, May 16, 1935, at 11 A.M.

Dr. Michael A. Tighe of Lowell and Dr. Charles E. Mongan of Somerville addressed the Society on the subject "Federal Compulsory Sickness Insurance."

Dr. Tighe gave a carefully prepared talk on the proposed national legislation regarding compulsory sickness insurance, its probable effect upon medical practice in Massachusetts and what the Massachusetts Medical Society and its constituent county societies could do to prevent passage of these measures or to modify them before enactment.

Dr. Charles E. Mongan then gave a very interesting review of the origin of health insurance in European countries, stating that our proposed Federal Legislation in these matters was a copy of European laws.

#### ANNUAL MEETING

The annual meeting of the Plymouth District Medical Society was held at the Lakeville State Sanatorium, Thursday, April 18, 1935, at 11 A.M. At the business meeting the following officers for the ensuing year were elected:

President, William T. Hanson, M.D., Bridgewater, Mass., Vice-President, Charles Hammond, M.D., Hanover, Mass., Secretary, George A. Moore, M.D., Brockton, Mass., Treasurer, Alfred C. Smith, M.D., Brockton, Mass., Councilors, Thos. H. McCarthy, M.D., Nominating, Charles G. Miles, M.D., Alternate, William E. Curtin, M.D., Plymouth, Peirce H. Leavitt, M.D., Brockton, John J. McNamara, M.D., Brockton, Leon A. Alley, M.D., Lakeville, Alfred C. Smith, M.D., Brockton, Censors, John J. McNamara, M.D., Brockton, Leonard A. Baker, M.D., Middleboro, Richard B. Rand, M.D., North Abington, Arthur W. Carr, M.D., Bridgewater, David B. Tuholski, M.D., Brockton, Orator 1936, John J. Decker, M.D., Lakeville, Librarian, John H. Weller, M.D., Bridgewater, Commissioner of Trials, Fred F. Weiner, M.D., Brockton, Nominating Committee, Leonard A. Baker,

M.D., William E. Curtin, M.D., Richard B. Rand, M.D.

The Annual Oration was delivered by Dr. E. B. Gilmore of Brockton, who took for his subject "Diagnosis of the Acute Abdomen." The speaker emphasized the value of early diagnosis, a searching history and thorough physical examination in patients with acute abdominal lesions. He discussed the anatomy of the abdominal walls and stressed the value of knowledge of the innervation of these muscles in localized pain. The physiology of various organs was considered in some detail and the symptoms of the more common pathological processes. This was followed by a careful review of the differential diagnosis of many acute abdominal diseases.

Following the literary program Mr. Alexander McLeod of Westwood, Mass., gave an interesting talk on "A Trip Through Africa, New Zealand and Tahiti" illustrated with lantern slides and moving pictures.

The members were guests of Dr. L. A. Alley, Superintendent of the Lakeville Sanatorium, for dinner.

GEORGE A. MOORE, M.D., *Secretary.*

### BRISTOL NORTH DISTRICT MEDICAL SOCIETY

The Bristol North District Medical Society recently held a Special Meeting at the Sturdy Hospital in Attleboro for the di :ussion of Medical Economics. Drs. Charles E. Mongan, Walter A. Lane, and Michael A. Tighe of the Committee on Public Relations were the speakers.

C. B. KINGSBURY, *Secretary.*

### THE MALDEN MEDICAL SOCIETY

The Annual meeting will be held on June 18, 1935, at 6:30 P.M., Unicorn Club, Stoneham.

Speaker: Charles Wilinsky, M.D., of Beth Israel Hospital.

Mr. Grant Gay will show Travel Films.

A. H. WARREN, M.D., *Secretary.*

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JUNE 17, 1935

**Tuesday, June 18—**

*12 M. South End Medical Club. Office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston.

†2:30-4 P.M. Ward Visit, Massachusetts Eye and Ear Infirmary.

**Thursday, June 20—**

*12 M. Clinico-Pathological Conference. Massachusetts General Hospital.

†12 M. Clinico-Pathological Conference. Children's Hospital.

**Saturday, June 22—**

*10-12. Staff rounds at the Peter Bent Brigham Hospital. Open to practicing physicians.

*Open to the medical profession.
†Open to Fellows of the Massachusetts Medical Society.

**June 17-19**—The Medical Library Association will meet in Rochester, New York. For information address Miss Frances N. A. Whitman, Librarian, Harvard University Schools of Medicine and Public Health, Boston, Mass.

**June 17 to 21**—Convention of the Catholic Hospital Association will be held at Creighton University, Omaha, Nebraska. For information address the Most Reverend Joseph Francis Rummel, D.D., Bishop of Omaha.

**June 18**—South End Medical Club will meet at the office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, at 12 noon.

**June 18**—Lawrence Cancer Clinic. See page 1150.

**June 18**—The Malden Medical Society. See notice elsewhere on this page.

**June 24**—Boston City Hospital. Henry Willard Williams Memorial Lecture. See page 1150.

**June 24-28**—American Urological Association and Western Branch Society, American Urological Association, will meet at the Palace Hotel, San Francisco, California. For details write Dr. Charles P. Mathé, 450 Sutter Street, San Francisco, California.

**June 27-29 inc.**—British National Association for the Prevention of Tuberculosis will be held at Southport, England. Persons desiring further information should write to Miss F. Stickland, Secretary of the Association at Tavistock House North, Tavistock Square, London, W. C. I., England.

**July 1-23**—University of Freiburg i. Br. will hold a vacation course of the medical faculty. For information address Akademische Auslandsstelle der Universität Freiburg i. Br., Schwimmbadstrasse 8, Germany.

**July 22-27**—Seventh International Congress on Industrial Accidents and Diseases, Brussels, Belgium. The American Committee of the Congress is under the chairmanship of Dr. Fred H. Albee, New York, for the Section on Accidents, and that of Dr. Emery R. Hayhurst, Columbus, Ohio, for Industrial Diseases. The American delegation to the Congress will sail from New York on July 8 and visit London, Amsterdam, The Hague and Paris, and, optionally, Budapest. Physicians interested in the Congress or in the medical tour in conjunction with it, may address the Secretary, Dr. Richard Kovacs, 1100 Park Avenue, New York City.

**October 7-10**—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City.

**October 21 - November 2**—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9.

**October 28 - November 1**—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30.

## BOOK REVIEWS

**Clinical Pathology of the Jaws.** With a histologic and roentgen study of practical cases. Kurt H. Thoma. 643 pp. Baltimore and Springfield: Charles C Thomas. $9.00.

This book includes, in addition to a discussion of the common developmental, traumatic, inflammatory and neoplastic lesions of the jaws and oral cavity, a large amount of material on generalized or widespread skeletal diseases which only incidentally affect the bones of the skull and jaws. It also includes illustrative material and discussions of several imperfectly understood conditions of rare or infrequent occurrence. An effective method of presentation of each subject has been used. This consists of an introductory discussion or text followed by case reports which are very well illustrated with roentgenograms, photographs and photomicrographs. It has obviously been the author's intention to bridge a gap between the fields of interest and understanding of the physician and dentist, as well as to present the special problems of the oral surgeon. In the reviewer's opinion, this difficult task has been in part successfully accomplished. The dentist should find the book to be of value since it brings together in a single volume a large amount of illustrated material on local and general disease processes which would

otherwise be difficult for him to obtain. For quick reference the clinician, roentgenologist and pathologist dealing with problems involving the oral cavity, jaws and skull, should also find this book to be useful. The treatment of most subjects should suffice for the casual reader but, as one might expect in a book so inclusive in its scope as this, students of special subjects will find it necessary to consult more authoritative works dealing with their respective problems. The reviewer would prefer relatively greater emphasis on actual disease processes affecting teeth, jaws, and oral cavity, even at the expense of greater brevity in the discussions of rare or interesting generalized skeletal diseases which are being intensively studied at the present time.

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**How Safe Is Home?** Howard Whipple Green. 48 pp. Cleveland: Cleveland Health Council. 50 cents.

This compilation of facts concerning home accidents in Cleveland for a five-year period offers a mine of material to those interested in accident hazards in the home. A large number of diagrams showing the local distribution of the accidents in Cleveland are of no general interest, but certain of the charts showing the type of accident and emphasizing the relation of the frequency and severity of accidents to the economic condition of the home are of very real importance. Studies of this type covering an entire community well supplement the experience of insurance companies and should lead to the development of adequate data for basing a campaign of prevention.

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**Sculpture in the Living.** Jacques W. Maliniak. 203 pp. New York: Romaine, Pierson Publishers, Inc. $3.00.

This book was intended, according to the author's statement, to present the entire subject of plastic surgery in a simple, readable way for the general practitioner and the specialist who lack time for exhaustive study of the subject.

The reviewer's opinion is, however, that the various subjects are covered so superficially that it could hardly be considered useful to the medical man, except for those who desire a smattering of general information. On the other hand, the book seems rather to be written in such a way as to attract the interest of the general public. Its usefulness as a lay treatise is, to my mind, doubtful.

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**The Patient and the Weather.** William F. Petersen and Margaret E. Milliken. Volume III. **Mental and Nervous Diseases.** 375 pp. Michigan: Edwards Brothers, Inc. $5.00.

This book is one of a series of volumes on "The Patient and the Weather," this being the third publication, entitled, "Mental and Nervous Diseases." The author, professor of pathology and bacteriology at the College of Medicine, University of Illinois, Chicago, is indebted for his clinical material to Dr. H. Douglas Singer, Director of the Psychiatric Institute of Chicago. The first part of the book deals with general considerations such as genetic factors, the rôle of atmospheric alterations in mental disease, the seasonal concept of mental conditions, suicides and their relation to the regions where they take place, and similar problems. A second part, and by far the larger portion of the book, is devoted to the clinical aspect of this work. There are many case histories both of mental disease in its various types and multiple sclerosis, tabes, poliomyelitis and meningitis. It is the latter part of the book which will be of most interest to physicians. Apparently the author and his coworkers have made very extensive examinations of these patients and numerous details are given of their mental reactions, physical characteristics, and the laboratory data obtained from the blood, spinal fluid, etc. There are numerous charts and figures, the charts sometimes serving only to confuse the issue.

So far as can be ascertained from a somewhat prolonged reading of this book, the author attempts to show that some nervous and mental diseases are markedly affected by conditions of the weather which "interfere with the normal oxidation of the extremely active metabolism of the central nervous system". The reviewer doubts if one should infer from this that there is an "oxidation of metabolism", but this clause is about as clear as most of the statements in the book. Ends of sentences are omitted, verbs are left out and references wrongly given, with bewildering frequency.

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**A Textbook of Pathology for Nurses.** Coleman B. Rabin. 243 pp. with 61 illustrations. Philadelphia and London: W. B. Saunders Company. $1.75.

There are relatively few textbooks of pathology for the use of nurses. The problem of how much to include in a volume of small compass is a difficult one but Dr. Rabin has made his selection wisely. Rather than emphasis on specific disease processes there is a discussion of the various types of pathologic changes affecting the different organs and tissues. The illustrations are well chosen for their purpose. A set of questions at the end of each chapter aids the student in summarizing the knowledge she has gained. The final four chapters cover in a general way laboratory procedures.

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**Treatment by Diet.** Clifford J. Barborka. 615 pp. Philadelphia: J. B. Lippincott Company. $5.00.

This eminently practical book aims to present concisely and systematically methods of prescribing diets and applying treatment by diet to health and disease. Discussion of theories is brief. Dietary prescriptions are given in great detail, first for diseases such as diabetes, deficiency diseases, etc., where the diet is of paramount importance and secondly, for conditions in which diet is of varying importance, as in diseases of the circulation, febrile diseases, and intestinal disorders. Food recipes are included and also an excellent bibliography.